GAS JOURNAL

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IN MID-WALES

IT was a happy thought that the Autumn Meeting of the Wales and Monmouthshire Association of Gas Engineers and Managers should be held in Mid-Wales, thereby indicating the cohesion between North and South. The venue selected was Llandrindod Wells and the pleasure of the meeting on Tuesday and Wednesday of last week was heightened by wonderful weather amid grand scenery. The attendance was large and the entire proceedings, both business and social, including a visit to the Elan Valley—the water shed for Birmingham—went through with a smoothness reflecting on the organization capability of the Secretary, Mr. Darrell Rees, to whom thanks were rightly voiced both publicly and privately. The outgoing President, Mr. E. M. Edwards, in relinquishing office did so in the knowledge that he had handed on the affairs of the Association to his successor, Mr. F. Dupont, of Brecon, in a thoroughly healthy state and with great promise for the future.

The spirit of co-operation was never more in evidence: of this we are certain. And behind this is the growing appreciation, even among its own experienced members, of the potential strength of the Gas Industry. This irrespective of nationalization or otherwise. To-day, the Industry is a large one and essential to the national economy. But it could extend its services, through its peculiar facilities and advantages, enormously; and it is to wide extension, not petty increases, that responsible executives must look and on which they should base their plans. Again, as Mr. C. H. Chester, Junior Vice-President of the Institution of Gas Engineers, aptly emphasized during the course of the meeting, whatever the future holds, there must be that freedom of expression and opinion which marks the activities of the Institution itself and of its affiliated Associations both Senior and Junior.

A report of the proceedings at the meeting in Llandrindod Wells (how much easier for the Englishman to write than to pronounce) appears in our issue to-day, together with reference to a Paper of an unusual character contributed by Mr. R. M. Quarry, Chief Engineer at the Neath Works of the Metal Box Company, on the subject of "High-Speed Food Can Manufacture," wherein the Author paid tribute to Mr. W. Clark Jackson, Neath Gas Engineer, in providing a gas service which made such high-speed processing possible. Here again was a practical example of co-operation which has fostered the general prosperity of the district—co-operation which indeed points the way.

HIGHER TECHNICAL EDUCATION

AMID and below the clamour for increased production there lies one fundamental to which little attention is paid. The insistence of Government spokesmen—a few months ago—on research was highly laudable on the assumption that research would be conducted by those who understood it and not nationalized. But who is to do the research work? The answer can only be that research must be done by trained scientists; only by the employment of such men in adequate numbers can we in Britain undertake the volume of research that it is necessary we should undertake as a long-term policy. Just now, however, we seem to have forgotten long-term policies in the urge to rectify our short-term position. When the research has been brought to a successful conclusion and in laboratory apparatus and semi-scale plants new processes have been demonstrated, who will translate the research onto the practical scale of production? The answer, again, is that this must be done by trained engineers, chemical engineers, and other specialists. On all sides it is recognized that British industry must expand. Enormous attention is paid to the slightest wish of organized labour, but the technologist receives scant courtesy. If he earns a little more than a workman he is taxed proportionately more severely. There is no incentive for a man to raise his status, and one result is a shortage of the type of technologist and scientist who is so sorely needed.

The position must be squarely faced that we have not the men trained in sufficient numbers to expand production as it needs to be expanded. We have seen it stated that whereas the U.S.A. turns forth into her industries some 2,000 fully-trained chemical engineers each year, British industry receives no more than 50—and needs 800. Unquestionably, part of this deficit is due to lack of incentive. We are reaching a stage when the middle classes—"the backbone of the nation" from whom come these scientists and technologists—cannot afford to educate their children into trained engineers or chemists. The parents guide the children into a career, and that guidance will naturally depend on the children's abilities, but even more on the parents' purses. Oppressive taxation and high costs that are not covered by increased incomes are a strong deterrent to technological training. To remove that handicap, to enable education to be secured by all who have the necessary ability, is one part of the answer to the problem before us. Whether the ultimate answer will be that all education will be provided at State expense, we shall not enquire here. That it is the Socialist policy is undeniable. Whether it is not one more nail in the coffin of that individualism which has created the greatness of Britain, we shall leave others to argue. Whatever may be the means by which it is done, it is necessary to make it possible that a sufficient number of those who can profit by higher education should receive it.

Question of Status

Another peculiar difficulty of the industrial problem is a reluctance on the part of the more highly intelligent students to specialize in technology. The Percy report insisted that "too large a proportion of the best output of

the schools goes into non-industrial occupations" and that industry and educational institutions training for industry are not getting their fair share of the national ability." An enquiry into the employment of Cambridge graduates issued before the Percy report came to much the same conclusion —namely, that because existing secondary education has tended to discourage boys of first-rate ability from entering industry along the normal technological road, there is "urgent need for a national campaign to increase the prestige of the technical professions and to counteract the impression that the road to responsible executive posts in industry does not lie through those professions." Industry and the Ministry of Labour are doing useful work in countering the unfortunate impression mentioned. But there is still more that can be done. The Cambridge enquiry pointed out that the ambitious technical graduate knows that he will not get equal status with the administrator either in Government service or in business. Industry, it has been argued, has not as yet come to appreciate fully the importance of intellectual freedom, as well as a worthy status, for the ablest of the technicians whose services it should be seeking. In marked contrast with this view is that put forward by a speaker at the recent T.U.C. conference contrasting the wages of the coal miner with the £3,000 or £4,000 a year paid to those who direct him. Had that been said by a technical man it would rightly have been classed as "wishful thinking." Technical men, like those who they are euphemistically said to control, have found it necessary to organize themselves into Guilds and Associations to safeguard their interests. There is much that industry can itself do to encourage entrants into the higher technical branches. We hope that the Gas Industry will do whatever is necessary in this respect. The National Coal Board has given technologists their chance in this direction and has put technologists in charge of most departments and operations of coal production and preparation. We shall watch with interest to see what sort of a job they make of it.

The Technical Colleges

When all the difficulties mentioned are overcome and the status and conditions of service of the technologist in industry have been made such that these professions rise high in popular esteem, one of the greatest obstacles of all remains to be surmounted. The Percy report recognizing that there was need for proper facilities for technological training set out "to suggest an organization of higher technological education which will be more responsive and adaptable to the needs of industry," and it recommended the selection of a strictly limited number of technical colleges in which there should be developed technological courses of a standard comparable with that of degree course, the conditions in each college being adapted to suit local needs. These colleges should conduct their own examinations and award their own qualifications. What those qualifications should be would depend on circumstances; some favour B.Tech., others a Diploma of Technology.

Whether the Percy report went far enough is open to doubt. It dealt with the status of the technical colleges but did not directly deal with the problem of greatly increasing the facilities available for technological training. Status rather than quantity was the theme, though quantity was implicit in it. The Parliamentary and Scientific Committee has given independent thought to the problem of increased training and educational facilities and has concluded that owing to the nature of the development of advanced educational facilities in this country, there exists no clear-cut demarcation of the functions of the universities and the major colleges of technology. There is ample scope for both, not as competing but as complementary institutions which can jointly contribute towards our national needs for qualified scientists and technologists.

Our facilities are less than those of America and less than the comparable pre-war facilities on the Continent, but with adequate provision for higher technological education this country could again secure the benefits of our technical and scientific competitors in technical manpower and regain our pre-eminence in the markets of the world. The committee, supporting the Percy report, has concluded (a) that the study of selected branches of technology presents a problem which cannot be solved by devoting to it a post graduate year and (b) that therefore the study of selected branches of technology, together with the appropriate basic scientific foundation, should lead to the award of a degree in order to attract into these courses a fair proportion of men and women of high ability. This degree is regarded as preferable to the qualification given by a professional institution, which lapses if the individual ceases to become a subscribing member.

The position as the Parliamentary Committee sees it is that existing facilities are woefully inadequate and that it is a matter of great urgency to consider the best method of utilizing the potential capacity in the colleges of technology for the training of qualified technologists to meet our national needs. But if men and women of ability are to be attracted to the courses in technology in the Colleges of Technology, the status of those Colleges must be similar to that of the Universities, and they must be developed into responsible institutions performing a national function. In that the committee follows the lead of the Percy report. The raising of the status of the Colleges of Technology is urgent. They are at present working under a handicap in the award of qualifications. They have not the prestige of many similar colleges abroad, and are in general failing to attract men and women of first-class ability.

Staff Salaries

The status of the lecturer is very much lower than it should be and is generally not such as to attract first-class men. We highly approve the view that to maintain the standard of work, and to secure the employment of the highly qualified staff the Minister of Education desires to see in the colleges of technology, the Minister should invite the Burnham Committee to make provisions for special scales of salaries applicable to the staffs of the selected departments of colleges of technology comparable with those for staffs of universities. A head of a department (or professor) might, for instance, be paid a minimum basic annual salary of £1,400; a senior assistant (or reader), £800 to £1,200; a lecturer, £400 to £850, with appropriate family allowances. Unless we attract first-class teachers we cannot give students a first-class training. The calibre of some University lecturers, even, is not as high as it should be. This is generally because the conditions are not sufficiently attractive. Not only should the salary of the lecturer in the selected departments of the colleges of technology be related to that of his colleague in the university, but also to the salaries in industry.

There is little in the report of the Parliamentary and Scientific Committee that does not follow closely the lines of the Percy report. The most important thing is to get something done. Reports are useless unless they lead to action. Can we not find some way of blocking the pigeonholes in Ministry buildings, as at this season of the year the bolt-holes of the foxes are stopped? The matter is urgent. The Barlow Committee in its Report on Scientific Man Power (Cmd. 6824) stated that "if we are to maintain our position in the world and restore and improve our standard of living, we have no alternative but to strive for that scientific achievement without which our trade will wither, our Colonial Empire remain undeveloped, and our lives and freedom will be at the mercy of a potential aggressor." Doubling the number of scientists and of technologists is a matter of the utmost urgency. This task will fall upon the universities and the major technical colleges.

Only by Government action can the universities and technical colleges be enabled to make the necessary changes. All industries, and not least the Gas Industry, need a large influx of skilled scientific technical men. Industry must do its part in raising the status of these posts and making them more attractive. But the greatest part of the work must fall upon the Government for reasons we have here stated.

COMPOSITE COMPANIES

A relatively small number of gas undertakings are owned by composite gas and electricity companies, and the question arises under the Electricity Act, 1947, under which the electricity industry is to be nationalized, as to whether such companies should hand over both undertakings lock, stock, and barrel, or whether they should retain their gas undertakings. The problem is to be discussed by the proprietors of the Brixham Gas and Electricity Company at an extraordinary meeting to be held next Friday. In a circular to the shareholders, from which we give extracts elsewhere in this issue, the Directors make no recommendations themselves but invite the proprietors to reach their own decision. The main problem is the question of compensation. Brixham shares are not quoted on the Stock Exchange, and therefore the value of the securities would be determined, failing agreement with the Minister, by arbitration. If it is decided to retain the gas undertaking, the amount of compensation will be restricted to that in respect of the electricity undertaking, to be determined according to the ratio which the average net revenue earned by the electricity undertaking in respect of the three financial years preceding January, 1947, bears to the average net revenue earned in respect of those years by the Company as a whole.

Commentary by "Abaris"

The World Power Conference

The proceedings of this high power conference passed almost unnoticed in the Press we read daily. Scarcely a word came out of the Hague for the edification of the masses; yet much that went on has a direct bearing on the lives of all of us, and we should be grateful for the physical and mental effort used on our behalf.

The Fuel Economy Conference which formed part of the W.P. Conference, had more than one Paper of very direct interest to our Gas Industry, and I hope that the necessary steps will be taken to ensure that they are circularized. The Technical Director of Woodall-Duckham's gave a Paper on "Fuel Economy in Coal Carbonization," and a joint Paper was presented by L. W. Andrew and Dr. A. L. Roberts on "The Function of Convection and Radiation in Heating by Gas." But atomic energy, gas turbines, aviation fuel, and coal, to name just a handful of subjects, were also dealt with.

Most of us have a good idea of the technique of heating by radiant, or convected heat, although the little matter of wavelengths may be a trifle obscure to those among us who are not physicists. Andrew and Roberts point out that the present trend in this country to-day, in heating, is to increase the proportion of radiant to convected heat for process drying and for the heating of industrial and commercial premises; and in domestic heating, to increase the proportion of convected to radiant heat.

I do not know Dr. Roberts, but I have met Andrew on quite a few occasions. The latter is in charge of the Space Heating Laboratory in the Gas Light and Coke Company's Watson House, and I doubt if there are 10 men in this country who know as much about the doctrines of comfort as he does. To him, radiation, convection, and ventilation are an open book, though I am sure he would say that many pages are still uncut.

Fair Fields and Towns

If ever you are fortunate enough to travel down from the Highlands of Scotland to the Lowlands, you will be struck by several things.

The first will be the almost sudden appearance of aggregations of houses, like a cancerous growth on the green earth; the second will be a sequence of the first—an enormous cloud of misty smoke that hovers solidly over those urban areas, particularly in the belt between Edinburgh and Glasgow. The third will be the ugliness of industrial areas. (As an afterthought to the foregoing it seems to me to be so English to want to see foreign lands before one visits the grandeur of one's own islands. I know of only one other continent in which the gentility and awe of the Scottish scene can be equalled. But then I must leave you to the thousand guide books wherein you may read what the experts say.)

All our manufacturing centres sprawl over the scene, and each is signalled by the great bolster of smoke that blots out the sunlight so successfully, and with such paralyzing results. Underneath those bolsters of Stygian gloom live millions of people who struggle mentally and physically to survive. The children are born with that tremendous handicap; the aged pass on leaving behind them nothing but a tombstone that will be eaten piecemeal by the sulphurous atmosphere they have quitted.

The fortitude of the human body is remarkable. Day after day, the stomach is subjected to an avalanche of food, several times every 12 hours. Its work is sporadic; but not so the labours of the lungs which inspire and expire many times during every minute of life. We need not worry our heads with the details of oxygenation, but it is discomforting to know that our lungs get grey-black with the dust and other solids and vapours that we have to breathe in.

It is no exaggeration to say that millions of people die prematurely every year because their organism can no longer cope with the poisons they have been absorbing slowly during their lives. Respiratory diseases are far too frequent in this country, yet we go on using raw coal in household grates, almost blithely.

Tons of soot fall every year on every square mile in every town, and the cost of this dirtfall is incalculable. In sheer waste alone, £4 is thrown away from every ton of coal costing £5, in terms of labour it means that 80 miners out of each hundred have wasted their efforts in the production of household coal.

Trying to Explain It

I imagine that most of use are fatalists rather, in the matter of rising costs and rising prices. If the price of a commodity goes up, we shrug our shoulders and say "Kismet" and decide then and there to spend less of our hard-earned money on that particular thing. We hope against hope that all these increases will somehow be pegged, or stabilized, so that we may know to within a pound or so how far our shrivelling incomes will go; and what kind of standard of living we can afford.

Those who work in a particular industry know most of the facts about their own rising costs, and the higher selling costs of their goods. The public—and it includes you and me—cannot be told all the facts by all the industrialists, because life is too short and paper supplies are limited. Newspapers can supply only some of the details.

Gas is used in nearly every home in this country, and its widespread use merits special explanation when it comes to telling consumers about increases in the price per therm. It can be left to the British Gas Council to handle the national Press; and local papers can be dealt with by local undertakings. But people forget quickly what they read in the dailies, and the trouble starts when they get a gas bill. That is the time to remind them of your costs, and it can be done relatively simply and cheaply with a small sticker, on the account.

Stark facts, I suggest, should only be given in a short clear table. This table should show the following figures:

Cost of coal, in 1938 and in 1947.
Average labour cost per week in 1938 and 1947.
Cost of freightage per ton in 1938 and 1947.
The price per therm in 1938 and in 1947.

The table could be rounded off neatly with a foot note to the effect that all costs have gone up by 100%, but the price of gas has only advanced by 75%. (If this is the case.)

Elaborate leaflets are inadvisable, for they will only cause people to bridle.

Gas Refrigerators

There is a rumour going round that Electrolux are no longer going to make two of the most popular sizes of refrigerators: to wit, the L100 and the L220 models. I hope that this is not true as far as the latter is concerned, for without a doubt it was, and is, the most popular one ever marketed. Its price was reasonable, running costs low and its storage capacity very adequate indeed for the small households that populate this country. None will regret the passing of the smallest refrigerator, which has been replaced by the 150, a very workmanlike job in all respects.

Thousands of 150's have been put into housing schemes during the past months; some, a shame on it, are used as boot stores, stores for rags, kitten pens, and other doleful uses not recommended by Electrolux, Ltd., or by gas undertakings.

The L220 will be replaced by a slightly larger model, the 380 which, of course, already has been on the market for years. It is more expensive and may be out of reach of purses that are slowly being emptied by the rapacious Mr. Dalton. We do not want the electricity suppliers to collar this choice market, of which our 220 was a winner

Gas undertakings must have sold many, many thousands of them pre-war, while they were selling only thousands of all the other types. I honestly believe it would be a grievous fault to oust the 220 at this stage, for it was, and is, a great compromise between the smallest and the largest domestic refrigerator.

Personal

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Mr. JOHN R. GREGORY, Technical Assistant to the Oswaldtwistle Gas Department, has been appointed Deputy Engineer and Manager of the Brighouse Gas Department. During the war Mr. Gregory served as an Engineer Officer in the Fleet Air Arm.

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Mr. J. H. C. BATES, Technical Supervisor of the Brighton, Hove, and Worthing Gas Company, has been appointed Executive Officer and Secretary of the Eastern District of the British Gas Council, Federation of Gas Employers, and Regional Joint Industrial Council, and took up his new duties at 35, Hills Road, Cambridge, on Oct. 1.

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Mr. H. E. S. BIRKS, Deputy Engineer and Manager of the Spalding Gas Department since 1942, has been appointed Engineer and Manager of the Swadlincote Gas Department. Mr. Birks was educated at Goole Grammar School and Hull Municipal Technical College, and had his training at Leeds University. Before going to Spalding he was Assistant to the Managing Director of the Grantham Gas Company.

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Mr. WILLIAM P. SMITH has retired from his position as District Inspector to the Sheffield and District Gas Company after 49 years' service, during which time he has never been late or absent from his duties. Mr. Smith is a keen walker and a lover of the Derbyshire countryside, and as a token of their respect his colleagues have presented him with a copy of Badderley's Guide to Derbyshire and an envelope containing Savings Certificates.

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Mr. FRANK PAGE DAWSON, for many years Southern Manager of John Wright & Co., Ltd. (Radiation, Ltd.), has retired. Mr. Dawson, who was born at Newark, Notts., joined Wright's as a London representative in 1904. The Directors appointed him Southern Manager soon after the 1914-18 war. He was entertained at luncheon by the Board of John Wright & Co., Ltd., at Essex Works, Aston, Birmingham, on Oct. 3. His successor is Mr. PETER HAWKINS, who—as London Manager—will be responsible for the Southern area, which will in future be controlled from London.

Obituary

The death occurred suddenly on Oct. 2 of Mr. NORMAN SEVERS, Sales Manager of the Salford Gas Department. Mr. Severs, who was well known in the Gas Industry, had been in the service of the Department for over 33 years.

Letters to the Editor

Chemists and Technologists

DEAR SIR,—I was interested in your Editorial of Sept. 10 concerning chemists and technologists. As a fuel technologist of many years' standing in both the gas and steel industries, I was surprised to note in both your Editorial and Sir Ernest Smith's address no mention of the study of physics as a basis subject for the fuel technologist.

This science seems to be neglected, and I should recommend any student who wishes to develop from the purely chemical aspect to the status of a fuel technologist, not to ignore it.

My own recommendations for one who wishes to become a fuel technologist, irrespective of his starting position in industry, would be to study the subjects of chemistry, mathematics, and physics, to the standard of the pass B.Sc. degree, and combine with it the syllabus as laid down by the Institute of Fuel in its recent educational programme.

Physics has been the most beneficial science to me, since it forms the basis of most of the engineering work involved in the fuel technologist's duties, particularly when instrumentation is involved.

Yours faithfully,

South Wales. COMBUSTION ENGINEER.
Oct. 1, 1947.

Carbonization in Horizontal Retorts

DEAR SIR,—The Authors of the Paper under this title, published in the "JOURNAL" of Sept. 10 (p. 560) say: "When we carbonize with a pressure of one-tenth inch water gauge in the bottom mouthpiece . . . we have about two-tenths inch water gauge in the top mouthpieces, *due to the buoyancy of the warm gas*" (the italics are mine).

I submit that this statement is wrong, and that it masks a fallacy, which fallacy has persisted down the ages, to the detriment of progress, and the confusion of young practicians, on whom so much depends. Buoyancy of a gas depends on the relation between its specific gravity, on the one hand, and that of the volume of the other gas which it displaces.

An ascension pipe, or a scrubber stand pipe is in this respect a closed vessel, whence there is *no buoyancy*, and the contained gas will flow either upwards or downwards equally well, the flow depending on the pressure-difference alone.

In the early days of gas, before the advent of exhausters, our forefathers rightly placed the gas-works at the lowest level of the district served, so that the contained gas would leave the far-distant mains in the higher altitudes, at a sufficient pressure for the burners of the period.

This beneficial factor was due to the reduced pressure of the atmosphere at the higher altitudes, and *not to the buoyancy* of the gas, as wrongly stated in the slogan of the times—"*Gas tends to rise.*"

Thus, this fallacy taking firm root, ascension pipes became universally and without question adopted for horizontal retorts, which gave birth to the immense expenditure of time, money, and labour of pipe auguring for perhaps 100 years.

Accepting that the principle of ascension pipes for crude gas was wrong, it was my privilege many years ago to pioneer a descension scrubber offtake pipe, but the roots of this fallacy persist even to this day, so that the Gas Industry still adheres to a practice that conflicts with its science.

There is yet another aspect. A rapidly cooling crude gas will, I suggest, descend more easily than it will ascend because of the action of gravity on its rapidly forming sizeable solid and liquid droplets, and in the case of scrubber pipes, plus the assistance of the descending liquor spray, hence the nearer the approach to the ideal—level-gauge conditions.

Finally, I would ask, why not fix the gauge or gauges at midway height and read the pressure-difference at the top and bottom mouthpiece levels of the scrubber pipe and thereby ascertain direct the pressure difference needful for the flow?

Yours faithfully,

43, Uxbridge Road, H. J. TOOGOOD.
Hampton-on-Thames.
Sept. 29, 1947.

Diary

Oct. 11.—Scottish Junior Gas Association (Western District): Visit to Tradeston works of Glasgow Gas Department.

Oct. 13.—Midland Junior Gas Association: Joint Meeting with Wolverhampton and District Engineering Society. Address on "Fuel," Sir Ernest Smith, C.B.E., D.Sc., F.I.C. Wolverhampton and Staffordshire Technical College, Wolverhampton, 7.30 p.m.

Oct. 14.—National Federation of Gas Coke Associations: General Committee, Gas Industry House, 10 a.m.

Oct. 14.—Illuminating Engineering Society: Opening Sessional Meeting. Presidential Address, Dr. J. W. T. Walsh. School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1.

Oct. 14.—Wales and Monmouthshire Junior Gas Association: Meeting at Treforest. Presidential Address of D. J. Rowlands. Visit to Upper Boat Power Station of the South Wales Power Company.

Oct. 16.—Institute of Fuel: Melchett Lecture by Major Kenneth Gordon, C.B.E., "Hydrogenation in the Fuel and Chemical Industries." Gas Industry House, 2.30 p.m.

Oct. 16.—Midland Association of Gas Engineers and Managers: Autumn Meeting, King Edward House, New Street, Birmingham, 2.30 p.m. Films: "The Erection of the Rainbow Bridge at Niagara Falls" and "The Failure of the Tacoma Narrows Bridge."

Oct. 17.—Scottish Junior Gas Association (Western District): Royal Technical College, Glasgow, 5 p.m. Presidential Address of D. M. Rowan.

Oct. 18.—Manchester and District Junior Gas Association: Visit to Distribution Control Room and Garston works of the Liverpool Gas Company. Meeting at Radiant House. Presidential Address of F. Bell.

Oct. 20.—London and Counties Coke Association: Annual Luncheon 1 for 1.15 p.m.; Annual General Meeting, 2.45 p.m. Grosvenor House, Park Lane, W.1.

Oct. 21.—Southern Association of Gas Engineers and Managers (Eastern District): "An Informal Talk on the Kent Coalfield," G. le B. Diamond. Gas Industry House, 2.30 p.m.

Oct. 23.—Industrial Gas Development Committee. Gas Industry House, 2 p.m.

Oct. 24.—London and Southern Junior Gas Association: Meeting, Gas Industry House. Paper by H. R. Hart on "District Work Planning."

Oct. 25.—Yorkshire Junior Gas Association: Annual General Meeting, Royal Victoria Hotel, Sheffield, 2.30 p.m.

News in Brief

The Annual Dinner of the Association of the British Chemical Manufacturers, due to be held on Oct. 9, 1947, has been cancelled in conformity with the Government's wishes.

Hints on Saving Gas in the home are given in the October issue of *Your Business*, the monthly news sheet of the Birmingham Corporation. Consumers are advised to read their meters every week-end and enter the figures on a record sheet.

Tiverton Chamber of Trade has criticized the Town Council for selling domestic utensils in its gas and electricity showrooms. The President, Mr. L. R. Y. Carey, who is also Mayor, has given an assurance that in future no hardware will be disposed of at the showrooms and that the goods retailed there will be restricted solely to gas and electricity fittings.

Lectures for Brides are being given at the Sutton Coldfield showrooms of the Birmingham Gas Department under the auspices of the Birmingham branch of the Women's Gas Council. In introducing the lectures Miss K. M. Halpin, Chairman of the Women's Gas Council, said they were designed to promote a better understanding of the use and economy of gas in the home.

Borings at Edendork, Dungannon, at the south end of the Tyrone coal field continue to give promise of satisfactory results and are being continued in some other parts of the field. The company interested in the operations are former mine owners in England and bought out under the nationalization scheme. In former days, Tyrone coal was used for gas manufacture and was sold at the pit head as low as 7s. per ton.

In His Presidential Address to the National Association of Colliery Overmen, Deputies, and Shotfirers, Mr. A. Macalpine said that the number of salaried officials being appointed to run the mining industry was "accumulating fast." In 1935, when we exported 35,000,000 tons of coal to 56 countries, we had 15,000 salaried persons, he said. To-day, when we were not exporting any coal but importing it, there were 22,000 salaried persons. When we had 15,000 the cost of the salaries was 2½d. a ton; to-day it was 1s. 8d. a ton.

The Electron Jubilee Exhibition which opened at the Science Museum, South Kenginston, on Sept. 27 is to remain open until the end of January. The Exhibition has been arranged by the Institute of Physics and the Physical Society, in association with the Institution of Electrical Engineers, to mark the 50th anniversary of the discovery by Sir. J. J. Thomson of the existence of the electron. A handbook describing the exhibition and explaining the story told by the display can be obtained on application to the Institute of Physics, price 1s. 2d. post free.

A Report That Gas Consumption had Risen from 283 million cu.ft. in 1939 to 600 million at the present time—an increase of about 112%—was made by Alderman J. A. Rhodes, Chairman of the Gas Committee, in referring to negotiations with the National Coal Board on the question of supplies at a meeting of Mansfield Town Council. Appealing to the public to exercise economy, Alderman Rhodes revealed that during August and September there was an increase in demand of over four million cu.ft. compared with the corresponding months last year.

When an Enquiry was held by the Ministry of Fuel and Power into an application by Middlesbrough Town Council to erect a gas purifying plant on land not formerly used by the gas undertaking, opponents of the project complained that the St. Hilda Ward, where the plant was intended, was just a "dumping ground" for the Corporation's noxious undertakings. The Town Clerk (Mr. E. C. Parr) said that on the success or otherwise of the application depended the comforts and necessities of life for many people of Middlesbrough. The existing purifying plant had to cope with a 60% overload and on occasions this overload had reached 87%. Mr. J. W. Pallister, Engineer and Manager, said the plan involved the spending of £117,000 and would take 30 months to carry out.

Edinburgh Corporation's Public Utilities Committee has agreed that application should be made now for permission from the Ministry of Fuel and Power to increase the price of gas in the City by an average of 0.8d. per therm. The Engineer and Manager, Mr. D. D. Melvin, has reported that increases in the cost of railway carriage, coal, and gas oil since the original estimates for the current financial year were completed would cost in round figures £50,000 per annum. As the estimates for the year showed a deficit of £30,000, the total deficit for a full year's working might therefore amount to £80,000. The sum of £61,000 carried forward from last year might cover the increased costs in the financial year. Having regard to the delays involved in obtaining a permit to increase the price of gas and in the application of such a permit once it was received, Mr. Melvin suggested that an application should be made now for the necessary adjustments.

Copies of the following recently issued British Standard may be obtained on application to the Secretary, Institution of Gas Engineers, 1, Grosvenor Place, London, S.W.1: B.S. 1396: 1947. Gas Meter Cupboards. Price 2s. net (post free).

In These Days of Short Supply it is interesting to note that a well-made heavy duty wire broomhead is now available to gas undertakings and other concerns engaged in heavy industry. The Northern Pump & Equipment Company can give early delivery from stock.

Messrs. Robert Dempster & Sons, Ltd., announce that they have transferred their London Office from 16, Queen Anne's Gate, to 57, Tufton Street, S.W.1. Their telephone number (Whitehall 2661) and telegraphic address (Ellandors, Sowest, London) remain unchanged.

A Wrong Number crept into our reference to log sheets for steam boiler plants in the "JOURNAL" for Sept. 17 (p. 618). A reader who applied to the British Standards Institution for "B.S. 1345" reports that he received, instead of the charts desired, a specification for women's blouses. The number should have been "B.S. 1374."

The Midland Association of Gas Engineers and Managers will hold its Autumn Meeting at King Edward House, New Street, Birmingham, on Oct. 16, at 2.30 p.m. The general business will be followed by two films (by permission of the Institution of Civil Engineers), "The Erection of the Rainbow Bridge at Niagara Falls" and "The Failure of the Tacoma Narrows Bridge."

The Trade Statistics for June, 1947, just issued by the Department of Industry and Commerce in Eire, show imports of 23,492 tons of gas coal, valued at £105,793, as against 18,097 tons, valued at £53,074, in June, 1946. This brings the total of these imports for the first six months of 1947 to 54,938 tons, valued at £201,403, compared with 115,431 tons, valued at £332,734, in the corresponding period of 1946.

A Branch of the Engineering Industries Association is to be set up in Edinburgh. It is hoped to have an office established by Nov 3. The Scottish Branch of the Association meets in Glasgow on Nov. 4, when important questions relating to the industry will be discussed. The E.I.A. has made considerable progress recently in Scotland and comprises member firms totalling 3,000 all over Britain, and is representative of many branches of the engineering industry.

St. Helens Gas Department has been authorized to install an additional vertical retort plant of three million cu.ft. per day capacity at a cost of approximately £125,000. The Department has also received loan sanction of £19,000 in respect of hire purchase appliance transactions for the current financial year, and permission to lay a 10 in. high pressure main to the Parr Site, North Western Industrial Estates, Ltd., nine proposed factories. The main, which will cost £4,500, is also to be laid to the Sutton Rolling Mills and will improve gas supplies in the Sutton area. Recently, the Department took over the whole load of the Golborne Gas Company as a bulk supply to the company. This scheme has met with full success. The Gas Committee has approved the formation of a St. Helens Branch of the Women's Gas Council.

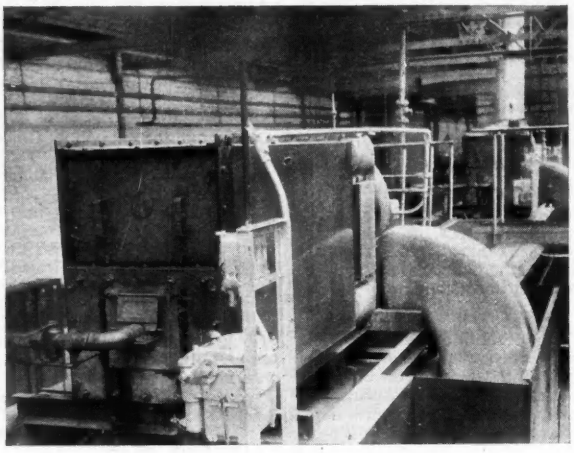
Paisley Gas Department's Extension to the carbonizing plant is rapidly nearing completion, and it is expected that it will be ready for gas making early in December. The total plant capacity will then be increased to five million cu.ft. per day. Negotiations are in progress which will in due course result in a considerable increase to Paisley's industrial load. Associated Clay Industries anticipate their requirements to be in the region of 150 million cu.ft. per year. Eadie Brothers, Ltd., are converting their producer gas plant, and it is expected they will use about 80 million cu.ft. of town gas annually. The Pressed Steel Company, Ltd., has taken over part of the Royal Ordnance Factory at Linwood, and will require an additional load of 75 million cu.ft. per year. Beardmores, Ltd., also on the Linwood estate, have applied for an additional load of one million cu.ft. per week.

Approval in General Terms has been given by the Ministry of Fuel and Power to suggestions made at a meeting of representatives of the Town Councils of Dumbarton and Helensburgh and officials of the Ministry that the gas-works at Dumbarton should be extended so as to supply in bulk the whole requirements of the existing Helensburgh supply area, and that the mains of the two undertakings should be connected as soon as possible. It was reported at the last meeting of the Dumbarton Town Council that to provide the bulk supply to Helensburgh and to meet anticipated demands from the Strathleven industrial estate and for local industrial and housing purposes it would be necessary to proceed with the extension of gas making plant to the extent of three million cu.ft. per day. The make of gas in June was reported to have been 34,331,000 cu.ft., an increase of 6,445,000 cu.ft. over the corresponding month last year.

HIGH SPEED FOOD CAN MANUFACTURE

When Mr. R. R. M. Quarry, M.A., read his Paper with the above title to the Wales and Monmouthshire Association of Gas Engineers and Managers on Oct. 1, he illustrated it with numerous lantern slides. Three of the photographs from which these slides were taken are reproduced. The Paper described the Neath Works of the Metal Box Co., Ltd., of which Mr. Quarry is Chief Engineer, and the part played by gas in the manufacture of food cans. The Company, whose 28 factories produce 1,000 million food cans per year, in addition to the general miscellaneous types of cans or containers, amounting to a further 600 million, built its large modern factory at Neath within a few hundred yards of the Corporation Gas-works, and a private gas main was laid on to the site.

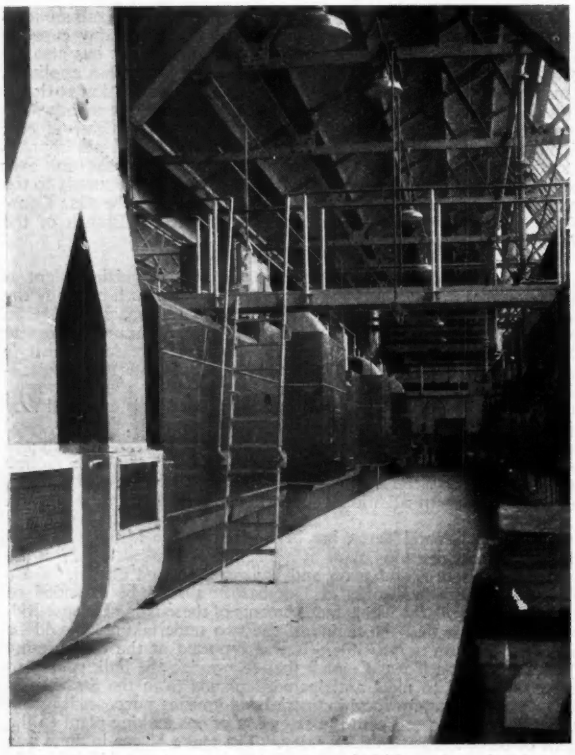
When the sheets of tinplate have been cleaned and lacquered, they are passed at the rate of 3,500 per hour through the long stoving ovens, each sheet having a stoving time of about 20 minutes at a temperature of 375° F. for the average lacquer. The side view of one of these ovens is shown below (left), their robust construction being due to their ability to pass one ton of tinplate at any one time. To heat this weight of cold metal in such a short time to the necessary temperature requires an efficient heating system and the consumption of large quantities of town gas. The gas is received at fluctuating pressures from the works and is controlled within fine limits by an Arca control valve, before being metered by a standard Holmes meter. The heating of the ovens is by means of three overhead fireboxes; a photograph of the middle firebox is shown (top). Fans circulate hot air from the oven and efficient combustion is afforded by the admission of the necessary quantity of primary air. All ovens are fitted with dial thermometers and temperature recorders spaced at frequent intervals throughout their length and careful setting of the independent thermostatic controls ensures very close control of oven temperatures. A safety device in the form of a fan failure valve is fitted for each burner so that the supply of gas is cut off in the event of the circulating fan failing to operate due to an electrical failure. Nevertheless a sudden drop in pressure in the gas supply may introduce a danger, but due notification of this is given by a system of automatic alarm bells which are arranged to ring at vantage points throughout the department. The supply pressure is recorded throughout the 24 hours of the day so that it can be compared with any unexpected drop in temperature as shown on the oven recorders. In order to test the fuel efficiency of any particular oven, an Electroflo recorder can be switched over rapidly to any oven under test.



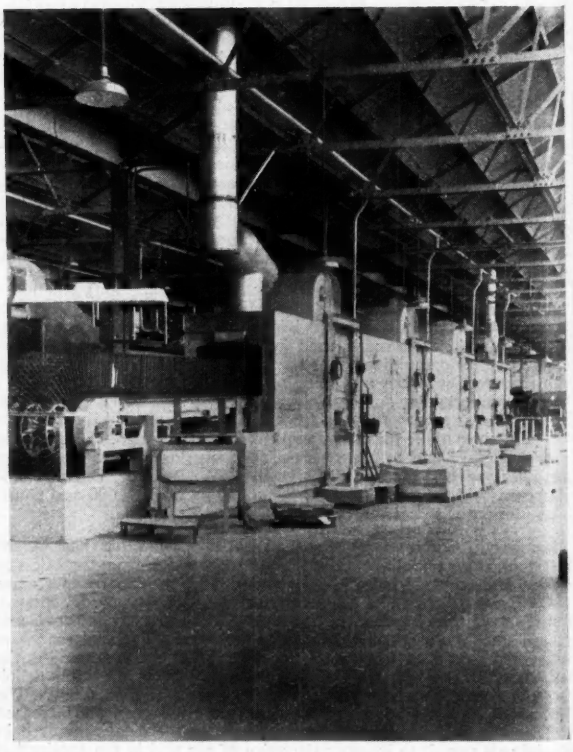
Middle fire box on lacquer machine

An alternative type of oven employs internal burners with overhead circulating fans. These ovens, one of which is shown bottom right, are also fitted with the usual controls and the same exhaust system is employed, but in this instance gas is boosted to a higher pressure of 40 in. w.g. and pre-mixed with air in a Selas mixer.

Gas is also used extensively in the fine canteen kitchens, pictures of which were included in the slides shown.



Side view of standard lacquer oven



Side view of the Ballård oven

WALES AND MONMOUTHSHIRE ASSOCIATION

LLANDRINDOD WELLS was selected as the meeting place of the Wales and Monmouthshire Association of Gas Engineers and Managers on Tuesday and Wednesday of last week and there was an attendance of 92 delegates from the North and South. Ideal weather conditions enabled members to enjoy the amenities of this lovely Welsh spa to the full, and Tuesday, which was given over to recreation generally, in which the golf tournament held the spotlight, proved a thoroughly enjoyable day.

At the conference on Wednesday morning Mr. **E. M. Edwards** (Port Talbot), the retiring President, introduced Councillor Gwilym Davies, J.P., Chairman of the District Council, and a civic welcome was extended by Councillor **Davies,** who said that if they were unable to offer delegates fresh eggs they could offer them the very best of fresh air, a claim which all present were able to substantiate.

Pointing out that this was the first time the Association had met in Llandrindod Mr. Edwards explained that since the marriage between North and South there was a strong feeling that the meetings should be held in a town which was as easy of access as possible to all members.

The **Secretary,** Mr. Darrell Rees, read apologies from Dr. Harold Hartley, Mr. J. R. W. Alexander, Mr. A. B. Badger, and Mr. Robert Martin, General Manager of the Metal Box Company, Neath, among others.

Sympathetic reference was made to the passing since the last meeting of the Association of Mr. Muir, son of the Pontypridd Engineer; Mr. W. H. T. Johns, Warrington; and Mr. P. S. Hoyle, Plymouth, who had attended a number of their meetings.

Revision of the Rules

Mr. **Edwards** read out recommendations from the Council with reference to the revision of rules, recalling the fact that the whole question, which had been raised at the last meeting of the Association, had been referred to the Council for further consideration. In the meantime the Secretary had communicated with members with a view to securing their views on the status of Associate Members, which had been the subject of some difference of opinion at the previous meeting; and the Council now submitted their considered views, which suggested that Associates should be persons not under 24 years of age and not engaged with any trading or manufacturing firm except where such applicants for associateship " have been already accepted as Members, Associate Members, or Associates of the Institution of Gas Engineers, or who possess technical qualifications or experience in allied industries which in the opinion of the Council merit special consideration." The Council further recommended that Honorary Members shall be persons qualified as a Member or Associate, the election to be at the discretion of the Council and subject to confirmation at the next General Meeting of Members.

Mr. **E. Ablett** (Swansea), speaking on the controversial issue of Associate Membership, said he was in entire sympathy with the clause in the revised rules as recommended by the Council, but he had been a member of the Association for many years and had a high regard for the responsibilities entrusted to the Council; consequently he viewed with a certain amount of reluctance anything which tended to limit the responsibilities and discretion of that body. Where the claims of an Associate to admission were concerned he would like to see the word " technical " deleted in connexion with their qualifications, and also the words " in allied " relating to the Industry in which he was engaged. His view that the Council was, and had been all along, capable of exercising its judgment and sense of proportion, and he would hate to see anything which would limit the power of discretion which had remained in their hands for so many years.

Mr. **A. L. Pickard** (Llanelly) said he was very pleased to note that the clause dealing with Student Members had been amended to persons not under 18 and not over 24 years of age studying for the recognized examinations of the Institution or a University degree, and that the maximum age of students who had been serving in H.M. Forces would be extended by the length of such service.

Mr. **Clark Jackson** (Neath) said as there seemed to be still some little difference of opinion in the matter of Associates, the issue should be submitted to every member by postal ballot. He moved this and Mr. **O. P. Cronshaw** (Rhyl) seconded.

Mr. **S. H. Lawrence** (Ellesmere Port) said there was a strong feeling among Associates arising out of the recent discussions of the Association that they were not wanted any more, and it was because of that feeling being conveyed to members at the last meeting that the matter had been referred back for further consideration. He was in entire agreement with the suggestion of Mr. Ablett, but he felt that the matter had been in abeyance quite long enough.

On going to the vote it was decided by a majority of two votes to submit the matter for postal ballot.

Induction of New President

The retiring President, Mr. **Edwards** introduced to the assembly Mr. F. Dupont, the incoming President, recalling the fact that Mr. Dupont and he were fellow-pupils under Mr. Clark Jackson at Neath for some few years. He was in a position to know and appreciate the high standard of technical ability displayed by Mr. Dupont and his record at Neath, and later at Brecon, had thoroughly justified that opinion. Apart from all that they knew him as a modest, unassuming gentleman of high integrity. This was an important period in the history of their Industry and of their nation, and many matters might arise during the course of the coming year when sound guidance would be required from all holding responsible positions in the Gas Industry. He had every confidence in the part which Mr. Dupont would play during that period.

Mr. **Dupont** briefly returned thanks for his election and the confidence placed in him, and in accordance with traditional custom handed the outgoing President a silver salver together with his warmest thanks on behalf of the assembly for a very fine year of office.

Mr. **O. P. Cronshaw** seconded the motion, which was carried with acclamation.

Mr. **Edwards** expressed his appreciation of the kindly manner in which both speakers had referred to his work during the year. He was delighted to see present that day Mr. Ifan Jones, his old chief at Holyhead, and Mr. Clark Jackson, with whom he had worked so long at Neath, to both of whom he owed more than he could ever repay. He had done his best during the 20 years he had been connected with the work of the Association towards discharging that debt, but he had a feeling that what he had done was very inadequate. Their Association comprised loyal colleagues with a strong sense of comradeship running through it, and it had been a real pleasure to him to watch the growing bond of union between North and South Wales. They now represented the whole Principality and he felt sure that both areas would benefit by the amalgamation. There was still much to be done, but he was comforted to think that members were very ready to recognize good work which was well done, and very tolerant of work which it had not been possible to carry out. He paid a warm tribute to the work of Mr. Darrell Rees, their Secretary.

The following Associate Members were accepted: Mr. James Pullin, Bala; Mr. Charles Filed, St. Asaph; and Mr. Stanley Armitage, Bristol.

High Speed Food Can Manufacture

A Paper was then given by Mr. **R. M. Quarry,** M.C., Chief Engineer at the Neath works of the Metal Box Company, Ltd., entitled " High Speed Food Can Manufacture." Dealing with the manufacture of tins for food packing and other containers, Mr. Quarry illustrated a very interesting talk with a series of slides showing the varying stages through which the raw tin sheet passed before emerging as the completed tin. Mr. Quarry said they were now turning out 1,000 million food cans a year in addition to tobacco tins and oil cans. He paid a tribute to the collaboration of Mr. Clark Jackson, the Neath Engineer, in the provision of a special gas service for the heating of his furnaces. To heat one ton of metal to a temperature of 375°-400° F. in 20 minutes called for the employment of very efficient heating. Gas had proved their most satisfactory heating unit and they had always gone back to it after being forced to fall upon other sources of heat during breakdowns and other causes. It gave the very close control that was essential to satisfactory output. Their ovens consumed 2,000 to 3,000 cu.ft. an hour and they always had to be mindful of the fact that failure of gas could ruin work in the course of process, whereas shortage of material merely held work up.

Extending the warmest thanks of the Association to Mr. Quarry Mr. **Dupont** recalled how years ago when at Neath he did some experimenting with gas in the lacquering of tinplates. He had spent many hours in a small local tin works trying out his ideas for lacquer work by gas.

Mr. E. **Ablett** (Swansea), describing the lecture as a pleasing and fascinating one and of a different type from their usual Papers, said it was interesting to note the extent to which they depended on gas for regularity of control. He wondered whether Mr. Quarry had any use at his factory for infra-red drying ovens.

Mr. **Quarry,** replying, agreed with Mr. Ablett's statement that the dependability of gas was a valuable asset, but it had to be pointed out at the same time that a sudden drop in gas pressure was fatal to them. They had installed in the Neath factory a system of automatic alarm bells to give notice in any department of a sudden drop in pressure. They had used infra-red during the war years when working on munitions, but they had not yet made use of it in their peacetime processes.

Mr. **Edwards** said they had seen the design and operative process of the very type of factory which they were trying to encourage in South Wales and it was a tribute to the co-operation of the Neath Gas Committee and the manufacturers that as a result of their joint efforts a highly essential industry employing considerable labour had been developed in their midst. It was a very fine example of good liaison work between the Gas Industry and manufacturers. He asked Mr Quarry if he had made use of a flame failure device and also the hot dip and the electrolytic processes.

Mr. **Quarry** said they had not actually got any flame failure devices working, but they had experimented with them. They had tried out one some time ago—one of his own device—which had worked quite well, but they had not yet standardized them. As for hot dips, they had used them and with new plant being installed they had used the electrolytic process on a small scale, but which he preferred he was unable to say at the present stage.

Not a Bad Record

Mr. **Clark Jackson,** proposing a vote of thanks to Mr. Quarry, said his relations with him and his firm had been of the happiest since the days when they had met to consider the question of gas supplies. They had not got the surplus gas available at that time and it meant the Neath Gas Committee having to spend a considerable sum of money. He had pointed out to his Committee at the time that the introduction to the area of a works of this type would mean a very large number of extra pennies to be dropped into the slot meters of the district and that the extension of mains would serve to cater for their increased consumer needs as well as assist the industry to become established in Neath. They put down a special plant for the purpose in 1938 and it had served its purpose well. It was true, as Mr. Quarry had pointed out, that there had been a few interruptions from time to time due to varying causes, but on high-speed running six days a week they had not a bad record.

Major **Ivor David,** seconding a vote of thanks to Mr. Quarry, said the Metal Box works was the type of consumer that the Industry welcomed, and the story throughout was one of happy and profitable collaboration between the Gas Industry and an essential manufacturing process.

Mr. **Quarry,** returning thanks, said that Mr. Jackson's penny-in-the-slot reference might be supplemented by the statement that more than £8,000 a week was paid in wages at the works.

The time and place of the next meeting was left to the Committee to decide.

At the luncheon which followed Mr. **C. H. Chester,** Junior Vice-President of the Institution of Gas Engineers, proposed the toast of "Llandrindod Wells, its prosperity and future," commenting at the outset that far too little publicity had been given to the charms of the town and district and its ideal amenities for the holding of conferences. He tendered the greetings of his President, Dr. Hartley, for whom he was deputizing. It was felt that there should be a closer tie between the Senior and the Junior Associations and the Institution.

Freedom of Expression

The Institution, he said, would be preserved under nationalization so that men within the Industry could voice their own opinions. That freedom of expression and opinion would no doubt be very necessary in a nationalized industry. If they in the Industry were going to see it prosper they must have freedom of expression in their Associations. He made an appeal to members to bear in mind the claims and good work of the Benevolent Fund of the Institution and to become regular subscribers, and expressed his pleasure at seeing Mr. Holmes Hunt, Chairman of the local Gas Undertaking, present.

Councillor **Gwilym Davies** replied, agreeing with Mr. Chester that Llandrindod had not been advertised as a conference centre as it deserved. He outlined its many amenities and expressed a hope that members would return and speak well of the town to their friends. He also extended a warm welcome to Mr. Holmes Hunt, a son of the founder of the gas undertaking in the town and district. They were all grateful to the family for having started the undertaking in what was then a very small community.

Mr. **Clark Jackson** proposed the toast of the "Wales and Monmouthshire Association of Gas Engineers and Managers," making special reference to Mr. Dupont, the new President, as one of his pupils, and to the excellent work he had done in Brecon. He had converted an old-fashioned undertaking into a modern and highly efficient works.

Mr. **Dupont** replied, returning thanks for the kindly references to his work and the confidence reposed in him by his election as President.

COMPOSITE GAS AND ELECTRICITY COMPANIES

An extraordinary general meeting of the proprietors of the Brixham Gas and Electricity Company has been called for next Friday to decide whether the Company should retain its gas undertaking and accept compensation for its electricity undertaking, or whether it should serve notice on the Minister of Fuel and Power with a view to transferring both undertakings to the new Electricity Board.

Provision is made in the Electricity Act, 1947, for the compulsory transfer of all electricity undertakings to the new Electricity Board; the date of transfer (in the Act referred to as "the vesting date") will be fixed by the Minister of Fuel and Power, but cannot be earlier than April 1, 1948.

The Act refers to companies which own not only electricity undertakings but also gas undertakings as "composite companies," and enables any such company to serve notice on the Minister requiring the Electricity Board also to take over its gas undertaking. This notice must, however, be served before Oct. 13.

If the notice is served, and both the gas and the electricity undertakings of the Company are transferred to the Electricity Board, compensation will be paid on the basis of the value of the whole of the Company's issued share and loan capital. The method of assessing the compensation depends on whether the particular securities are or are not quoted on the Stock Exchange. If they are quoted, the value is taken to be the mean market quotations averaged over certain specified dates; but if, as in the case of the Brixham Company, they are not quoted, the value of the securities is to be determined (failing agreement with the Minister) by arbitration; the arbitrator being directed to have regard to the value of other securities which had Stock Exchange quotations on the material dates, and are "most nearly comparable" to the Company's securities.

If, on the other hand, the notice is not served, the amount of compensation payable will be restricted to that in respect of the electricity undertaking. Having ascertained in the manner indicated the total value of the Company's securities, the proportion payable for the electricity undertaking will be determined according to the ratio which the average net revenue earned by the electricity undertaking in respect the three financial years preceding January, 1947, bears to the average net revenue earned in respect of these years by the Company as a whole. To illustrate how this formula would work in practice, assume an undertaking with an issued share capital value of £500,000, and a total net revenue of £50,000. If the net revenue of the electricity undertaking amounted to £10,000 (*i.e.*, one-fifth of the total) the compensation payable would be £100,000.

In addition to the compensation for the value of the securities, the Act provides for payment of an amount "by way of compensation in respect of the severance of the electricity undertaking from the remainder of the Company's undertaking," this amount being based on the number of thousand units of electricity sold during the year 1946.

In either case, the compensation payable under the Act will be satisfied by an issue of British Electric Stock, the amount being dependent on the market value of Government securities at the vesting date.

Two unknown factors prevent an exact estimate of the amount of compensation payable to the Company. In the first place the value of the Company's securities has to be determined by arbitration; and in the second, the amount of British Electric Stock to be issued will depend on the value of other Government securities at the vesting date.

Although the holders of the Company's Preference shares are not entitled to attend or to vote at meetings of the Company, their interests are affected. Accordingly Preference shareholders have been invited to attend, and any votes tendered by them will be recorded separately from those of the Ordinary shareholders.

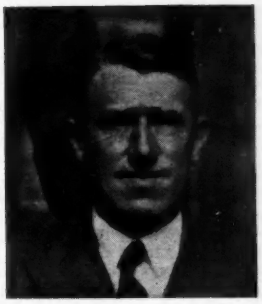
SEVEN SAFETY DEVICES

Seven devices designed to promote maximum safety in the use of domestic gas appliances are included in a "Safety in the Home" display arranged by the British Gas Council at the exhibition organized to celebrate the Silver Jubilee Congress of the Royal Society for the Prevention of Accidents which opened at Brighton on Oct. 7. In its drive for efficiency the Gas Industry has always recognized the importance of preventing accidents, and the exhibit epitomizes the Industry's concern for eliminating as far as possible the element of danger in the home. Beside each appliance is a scale model of the device employed.

The seven items shown are: (1) the spring loaded safety tap for gas cookers, which cannot be turned on accidentally; (2) the concealed self-lighting tap for gas fires, which functions only when turned on fully; (3) the baffle for multipoint water heaters, which ensures constant air conditions in the appliance; (4) the bayonet fitting and socket for portable appliances, which obviates the possibility of leakage; (5) the pilot safety device for water heaters, which automatically shuts off the main gas supply to the burner in the event of the pilot flame being accidentally extinguished; (6) the safety drop-tap for radiators, cookers &c.; and (7) the pressure cut-off valve for refrigerators.

NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION

PRESIDENTIAL ADDRESS *



of

J. G. AITKEN, M.Inst.Gas E.

Engineer and Manager, County Borough of Carlisle Gas Department

THE North West of England is somewhat isolated from the rest of the country and in consequence many of the members remain more or less comparative strangers to each other. It was, therefore, with particular pleasure that I accepted the opportunity of holding the Autumn Meeting this year in Carlisle, for it gives our members from the West the opportunity of meeting their contemporaries in conference and socially at a centre readily accessible to all.

Carlisle claims to be one of the first towns in the country to have used gas as an illuminant, and from records still in good preservation a complete picture of the birth of a great industry can be obtained. The Carlisle Gas and Coke Company was established by Act of Parliament on June 19, 1819, and eight months later the first gas was produced. The plans for the works were prepared by two brothers, Hugh and James McIntosh, of London, and Mr. Grafton, the Engineer of the Edinburgh Gas-works, acted as consultant.

Transport in those days was very difficult and all materials for the erection of the works had to be taken by road from the Midlands to Liverpool and shipped from there to a point in the Solway about seven miles from Carlisle and again carted to the site. Delays were frequent, due to tides, &c., and when breakages occurred, the anxiety of the Company to have the works completed in time can be appreciated. (The Company was also anxious at this time to obtain a book, the form of which would allow for the proper "government of the Manager.")

Earliest Retorts

Fifteen retorts were installed in units of three, made of cast iron and costing £32 10s. each. These retorts were 7 ft. 4 in. long by 19½ in. by 10 in. elliptical section. They held approximately 1 cwt. of coal and were worked on 4-hour charges. Round coal was fed to the furnaces and it was not until 1840 that coke was used for this purpose, and then as a mixture of two-thirds coke to one-third coal, but this mixture failed "to keep the heats up as briskly as round coal." The life of a cast iron retort was about one year, and in 1826 the works was thrown into "the greatest confusion by the bursting of three retorts at the same time." A clay retort was first tried in 1823 and cost £4 10s., but was described as a complete failure.

The fuel consumption for clay retorts in 1842 was claimed to be 25% and if tar was used, the solid fuel was reduced to 10%. These figures which had been put forward in support of clay retorts were much doubted by the Company, who estimated their fuel consumption at 33%, and found little difference when adding tar. D-shaped retorts were introduced in 1840, but this experiment was not at first considered successful and preference for circular retorts which had been adopted several years before was still manifest.

The layout of the works was simple and the plant consisted of 15 retorts, a condenser, liquor cistern, and purifier in cast iron, and a gasholder 26 ft. 4 in. diameter by 17 ft. 6 in. was housed inside a building. The type of purifier to adopt gave rise to much discussion, and special patterns were made in conjunction with Mr. Grafton. Lime supported on wire gauze was used, but the gauze corroded in a very short time and Mr. Grafton was asked to find a substitute. Eight years later it was stated, arising out of some claim or other that "our apparatus for purifying is as different as possible both in construction and operation from either Grafton's or Phillips'," the latter holding patent rights for a purifier in conjunction with a Mr. Holdsworth. Another reference to purification is found in a letter to Leeds gas-works which states that Mr. Clegg, of the firm of Clegg and Crosley, gas meter makers, London, had used "lime in a state nearly similar to yours before 1820," and, later, the Company were assuring the Watch Committee that they would endeavour by every means in their power to prevent any smell from the gas lime when being carted through the streets.

Main-Laying Problems

The mains from 6 in. down to 2 in. were laid by a contractor at so much per yard, but here a dispute arose because the contractor worked on the gross length, making an allowance for the spigot joint, and at this the Company was very indignant.

Cast iron pipes were then tested to 100 ft. head of water and this was increased in 1838 to 200 ft. The mains at that time were being supplied by Messrs. Newton Chambers. Service pipes were first laid in lead, and an order for this class of pipe in 1819 stated that they should be drawn in as long lengths as possible. Soon after, gun barrel iron tubing was in use. It is interesting to note that in the south this term for iron tubing is still in common everyday use. Brass and copper tubing were both used in 1823. Compo tubing was first mentioned in 1840.

In those days, gas was used entirely as an illuminant. Meters had not been perfected, and a charge per light was made. Three types of lights were common: the Argand burner, the Cockspur or Batswing, and the Jet. These were quoted at so much per light, and the hours of permitted light were clearly set out. Factories started at 6 a.m. and were lighted until 7.30 p.m. Street lamps were lit for 168 nights each year but not at periods of full moon. In 1823 the number of lights was 817, made up of 129 street lamps, 399 in cotton mills, and the remainder in houses and factories.

That meters were in demand early in the life of the Industry is evidenced by a letter dated Nov. 17, 1819, enclosing a remittance of £5 6s. to Mr. Crosley, of Clegg and Crosley, in payment for a meter, and enquiring at the same time "the cost of a meter for the retorts which will register from 30 to 40 thousand cu.ft. of gas in 24 hours."

In 1823, prices were invited from Mr. Milne, of Edinburgh, for various sizes of meters, and also one to take a 5 in. pipe in the yard. Mr. Milne's quotation for No. 1 size at £3 13s. 6d. was accepted. Though this meter measured the gas satisfactorily, it caused a No. 1 Argand burner to fluctuate at regular intervals when working at a maximum pressure of § in. W.G. The meter was therefore returned for alteration. In 1828 a meter was sent to Mr. Milne for repair and six more were ordered, so it would appear that meters were giving satisfaction at this time.

A year later, in 1829, the first mention of lights meters was made when an order for two 10-light and one five-light was sent to Mr. S. Crosley, but it was not until 1840 when a meter was sent on approval by Samuda Bros. & Co. that the "dry" meter was tried. This meter was not a success, and it was suggested that it be returned, but with a postscript offering £2 for it. The installation of a meter in 1841 was at the option of the consumer, and it is recorded that a resolution was passed in that year forbidding publicans and beerhouse keepers from using gas unless metered, under a penalty of £5. Gas governors were first introduced to Carlisle in 1840 by Mr. Samuel Crosley.

Tar at a Half-penny per Gallon

I am unable to find the price of coal at the time the works started, but coke was sold at 4½d. per peck, the Carlisle measure being equal to three Winchester pecks. Tar was then sold at 3d. per gall. Three years later tar was reduced to 1½d. per gall., and by 1840 had dropped to ½d., when coal was 10s. 9d. per ton for round coal and 7s. for small or nuts, and coke was sold at 2½d. per bushel or 8d. per basket. This is equivalent to 13s. 4d. per ton and gas was 8s. per 1,000 cu.ft. About this time (1840) only small coal or nuts was carbonized, still in cylindrical retorts and coal dropped to 5s. 9d. per ton in 1843 and produced 8,300 cu.ft. per ton. This coal had been used since the start of the works and came from the Haltwhistle district, and the drop to 5s. 9d. per ton coincided with the opening of the Carlisle to Newcastle railway.

In 1846 the gas-works site was required for railway purposes and in consequence a new works had to be built. This event marked what must have been in those days a remarkable adventure. The Corporation of Carlisle appointed 22 gentlemen to act as Trustees for the Corporation to purchase the assets of the gas company, for which £18,500 was paid. Under the guidance of the Trustees, the new works was built at a cost of £24,000, and with the passing of the Carlisle Gas Act in 1850 the Corporation in the following year took control of the undertaking. Mr. George Dixon was the first Chairman of the Gas Committee and in the 96 years which have elapsed since that date, only 15 gentlemen have occupied that position; a remarkable testimony of the keen interest and self-sacrifice of those who serve and control local government. The present Chairman, Sir Robert C. Chance, has filled the office for 21 years.

When the Corporation took over, the make of gas was 22,688,000 cu.ft., and the area of supply was limited to the centre of the City, the population of which was 21,878. Gradually the mains were extended, and as the various suburbs were supplied with gas a separate charge

* Presented at the Autumn Meeting, Carlisle, Oct. 3.

for gas was made to each community. In 1887 the Corporation sought and obtained power in the Carlisle Corporation Act of that year to extend the limits of gas supply to include parishes outside the boundaries of the City. The foundation of this policy indicated that wherever the rural population was dense enough then the advantages of a gas supply should be granted.

It had been realized from 1900 onwards that the works was incapable of being extended and that a new works would eventually be required. The consumption of gas, however, during the years between 1900 and the start of the first world war remained almost constant and it was not until 1920 that a decision was made to build the new works on the present site. This decision was by no means a unanimous one, for there was a strong feeling in the City Council that, facing ever growing electrical competition, the Gas Industry was finished. The wiser members, however, prevailed, and the present works was put into operation in October, 1922, having cost approximately £300,000, the gas made at this time being 408 million cu.ft., and as an answer to the pessimist, it has been more than doubled since that date.

The Present Works

When the details were being prepared for the present works, it was considered that the capacity planned would be adequate to meet the demand for many years to come, and while provision was made for future extensions, it was not thought that these would ever be needed. However, in 1935, it became apparent that with the ever increasing output, the long-sighted policy of the Gas Committee was fully justified, and an addition to the carbonizing section was sanctioned and put into operation in 1937. Again, it was considered that this added extension would suffice for many years to come, but in a very short time, the demand had outstripped the output and further new schemes have had to be prepared to meet the heavy loads which are being demanded from us by industrial consumers. It will be realized that a point had now been reached when the ancillary plant (originally designed in 1921) was being overtaxed, and any scheme for increasing the carbonizing capacity must also include provision for plant to deal effectively with the crude gas. Unfortunately, this scheme was not acceptable to the Ministry, and an alternative proposal had to be made, based on requirements to meet the immediate needs of the Department and such increases in output likely to accrue in the next year or two. The alternative proposal was acceptable, and a further extension to the existing retort house is in the hands of the contractors along with authority to install a new Connersville station meter, condenser, and exhauster.

Looking ahead, and not so very far ahead, schemes will again have to be prepared for plant to meet the needs which are undoubtedly bound to develop, and one would reason therefore that if the Ministry has schemes ready for the future prosperity of the Gas Industry, there is surely no more opportune time than the present for laying the foundations on which these plans can be built. One reads in the national Press that many millions of pounds are to be spent on erecting well planned and sited generating stations, and in all fairness to the Gas Industry, I consider that a further statement should be forthcoming from the Government indicating the policy to be adopted regarding its future.

Control and Restrictions

There is another matter to which I would like to draw attention—the question of controls and restrictions. It must be admitted generally that the purchase of stores and materials for the maintenance of an efficient gas supply is now more difficult than at any time in the past. Priorities and symbols are freely issued, but do the available supplies honour these tokens? If delivery dates are any criterion, then I am afraid they mean entirely nothing. There appears to me to be an entire lack of co-ordination between the Supplies Departments and the Ministry of Fuel and Power to ensure that the raw materials are available for our great Industry. For instance, it is of much greater importance to me that bricks, castings, and machine spares should be controlled than that the gas mantle position be reviewed monthly by the appropriate Government Department.

Again, the size of one's order book appears to determine the level of one's stock. As an example, certain undertakings have been embarrassed by a flood of meters, others by an influx of cookers which will suffice to cover the housing drive for years to come. Materials have been made available for new appliances, yet serviceable cookers and fires are practically unusable for want of a part weighing only a fraction of the whole.

The Ministry will not sanction the exchange of an old appliance for a new one unless the appliance is no longer serviceable, and rightly so, yet how can this tie up with the appearance in stores and shops of cookers, wash boilers, and water heaters which the consumer may purchase freely—of course, at an inflated price and without a free service guarantee. There appears to be ample scope for more planning here.

So far I have spoken of the past and the present. What of the future? I have mentioned the published plans of the electrical industry, but have yet to see any estimate of the proposed expansion of the Gas Industry. I presume that only the Ministry of Fuel and Power can make these available and I am sure that we ourselves would be astonished at the confidence the Industry has in the future if the Ministry saw fit to publish the figures, but these figures would not tell the complete story. There is no doubt at the present time a sense of caution due to the uncertainty of our future, and if the undertakings were free to prepare their own plans, then the programme would be even larger still.

Integration

Integration will take place—there is no doubt about that, but the method is exercising the minds of all. I liken this problem to the solution of a jig-saw puzzle. In our case we have over 1,000 pieces to deal with, and we would not attempt to solve such a puzzle by drawing all the pieces together at once. The obvious way is to survey the pieces which match, and fit them together. If there are enough helpers, a number of sections can be solved at the same time, and the completion of the puzzle is then relatively simple. So with the Gas Industry there are obvious pieces which both from their structure and locality can be integrated easily with probable advantage to all. On the other hand, certain sections present a considerable problem, the uniting of which can only be accomplished by adding to the individual pieces because some of them are incomplete. I refer, for example, to municipal undertakings where the finance section is generally outside the direct control of the management. Considerable re-arrangements of staff, stores, property, &c., will be required and it will be extremely difficult to maintain the normal functions of the Departments while this is taking place.

I would suggest, therefore, that the first step in a national integration scheme is to set up a commission of technicians to locate the nucleus round which each section would be built up. The commission would determine the size of the section, instruct the various authorities on procedure and, being armed with compulsory powers, guide local committees representing companies and municipalities—where both are included—in the formation of what will at first be independent groups. Later these groups would be welded into regions and eventually a central board might be set up to control the whole.

Evolution on these lines would, in my opinion, interfere less with the existing organization of the Industry, and enable expansion schemes to proceed immediately to the best advantage. Men who have brought the Industry to its present admittedly high state of efficiency are available and such a scheme is practicable.

I am aware that piecemeal integration may not find general approval, but I feel that the future well-being of many undertakings depends on bold decisions taken now, and any delay while awaiting a national scheme is not for the good of the Industry.

PROTECTIVE FILTERS FOR WELDING

Published evidence on the effects of ultra-violet and infra-red radiation on human eyes, and on methods of protection from harmful effects is surveyed at intervals by the British Standards Institution Committees responsible for the preparation of B.S. 679, Protective Filters for Welding, in order to ensure that this standard specifies not only requirements that will give adequate protection to wearers, but also permits the most economical production methods compatible with this protection. B.S. 679 has been revised on the basis of such a survey, as a result of which it has been decided that there is no danger from the infra-red radiation associated with gas-welding operations in which the operating temperature is relatively low, but that there might be danger at the relatively high operating temperatures reached in electric-arc welding. For this reason, no protection against infra-red radiation is specified for filters intended for gas welding but protection is specified for filters intended for electric welding.

Provision is, however, made in one type of filter for gas welding for the selective absorption of the yellow light of sodium and the red light of lithium, to reduce flux glare which would otherwise impede vision of the operation.

Suitable protection against ultra-violet radiation is specified for all types of filters, which are classified into shades according to visual density, and shades are recommended for the various types of industrial uses. Requirements for visual density, protection against ultra-violet radiation, total heat protection, and anti-glare protection are specified for two grades of filters, one for gas welding with or without flux, and the other for electric welding. The Standard also gives requirements for freedom from optical imperfections, lens and prism effects, uniformity of density, permanence of dyed interlayers and quality of cover glasses.

Provision is made, in addition, for colour grading to ensure uniformity, particularly in pairs of filters used in goggles. A complete list showing recommended uses of the grades specified is given in an Appendix. (Revision of 1946 edition.) Copies of this British Standard can be obtained from Sales Department, British Standards Institution, 24, Victoria Street, S.W.1. Price 2s., post free.

The Sixth Hinchley Memorial Lecture of the Institution of Chemical Engineers will be given by Dr. R. V. Southwell, M.A., LL.D., F.R.S., Rector of the Imperial College of Science and Technology, at the Institution of Mechanical Engineers, Storey's Gate, at 5.30 p.m., on Oct. 14. His subject will be "Relaxation Methods: A Mathematics for the Engineer."

INTRODUCING A NEW GAS COOKER

RADIATION, Ltd., has introduced the first of its post-war series of cookers in the New World No. 1430. The well-established principles of cooker design which have made the name New World a household word—single burner and Regulo control in the oven and Vertico taps on the hotplate—are retained.

The special points of this new series are:

The use of materials of construction which have proved to be most suitable for the purpose.

Extensive use of vitreous-enamelled sheet steel and, in some instances, aluminium alloys.

The patented chassis which forms the foundation structure, providing a rigid yet light framework of great strength.

Hotplate and oven constructed as separate self-contained demountable units. The one-piece grill chamber carries all the hotplate fittings.

Vertico taps, specially proof against leakage.

Sheet metal one-piece hotplate—light, strong, easily cleaned.

Patented vitreous-enamelled cast iron pan supports—small, effective, readily cleaned—which enable the smoothness of the hotplate top to be retained and contribute greatly to increased burner efficiency.

Specially designed hotplate burners (patented) enabling increased efficiencies to be attained while retaining the Radiation standards of combustion.

More effective grill with an increased area of even toasting.

New patented method of oven construction. One-piece oven with rounded corners, smooth interior and simple fittings, very easy to clean.

Aluminium alloy oven front—non-corrodible, easily cleaned.

New form of oven insulation—aluminium foil over glass silk blanket.

Patented door construction.

Simplified door hinging and latching (patented).

New patented form of door bedding—silent and secure.

New patented oven burner design. Single burner at the back with special housing and nozzle to direct the hot gases into the oven in the most effective manner.

Front-reading Regulo, readily accessible from the front (patented).

Small size removable enamelled grid guides, easily handled and cleaned.

Governor fitted as standard—simplified burner adjustments.

Plate rack and cover top of entirely new design, very easy in action.

Hard wearing, stain-resisting and, where necessary, heat-resisting vitreous enamels for cleanliness.

Simplicity of external line for easy cleaning and smoothness of contour with rounded corners contribute to a smooth, elegant appearance. Internal fittings are much simplified. Exterior sheets bear no structural load and are readily removed to give access to the hidden working parts.

New World standard of cooking enhanced with appreciable economy in gas consumption.

An overall gas saving such that four therms do work previously requiring five.

The resulting appliance is of amply rigid structure and yet light in weight, an advantage which will be appreciated during transportation both in gas undertakings' stores and on the consumer's premises. Considerable technical research has been necessary to evolve burners of satisfactory design and high performance to suit varying gas qualities. Special new enamels have been developed in the Radiation Laboratories for use with this cooker, especially on the hotplate. Many new patented features are incorporated.

General Features of Design

The salient dimensions of the No. 1430 cooker are: Overall height, 36 in. to hotplate level; overall width, 21 in.; overall depth, 19 in.; oven door opening height, 14 in.; oven door opening width, 15½ in.; oven depth, 14 in.

A unit principle of construction is adopted, with the hotplate and oven sections self-contained as independently demountable sections secured in a simple manner by screws to a chassis. This chassis is formed of right and left hand side-frames of braced angle iron held together at the back by a casting at the top and the trucking bar at the bottom, and at the front by the gas rail at the top and the front tie at the bottom. Absolute rigidity is thus assured. At the top of the chassis so formed the vitreous-enamelled sheet metal grill chamber is secured by two screws, and this grill chamber contains all the hotplate components. The gas rail is a fundamental structural member. It carries hotplate and oven taps and the inlet gas connexion linked to the pressure governor. The gas supply, though hidden, is yet independent of the hotplate and oven units.

Oven

The air-float oven is a single unit and comprises a body of welded sheet steel, vitreous-enamelled, bolted to an aluminium alloy front frame, the joint between these two parts being hermetically sealed. There is now no loose bottom plate in the oven. The lagging is applied to this body over the top, around the sides, and at the back, in the form of a blanket of stiffened glass silk covered by a hood of aluminium foil, the whole being secured by two circlets of pliable aluminium wire.

The oven body is secured to the chassis framework by means of four brackets screwed to the front through insulating washers. This is the only contact the oven has with the main framework except through the oven gas connexion and the flue nozzle, the latter being a loose fit in the flue outlet plate on the sheet metal back. Thus, adventitious loss of heat by conduction is reduced to the absolute minimum with consequent saving in gas. Substantially the oven is carried cantilever-fashion in the chassis, hence the name " Air-Float " which has been given to it.

The oven door hangs on adjustable hinge lugs attached to the front of the chassis frame and is readily taken off, together with the hinge rod and spacing bushes. Adjustment for door bedding is therefore exceptionally simple. The door itself is built on an aluminium alloy centre plate which supports a vitreous-enamelled door panel and door lining, between which a blanket of glass silk insulation is held. The Spring-Sealed door bedding consists of a U-section heat-resisting steel strip arranged to bed against a raised beaded edge on the aluminium alloy oven front. This strip is sufficiently springy to give a positive seal all round and forms a simple and effective method of sealing the oven door tightly. In production, the customary door bedding tests are carried out. A new design of adjustable door latch

New World No. 1430 Cooker in Cream Porcelain Enamel with Folding Plateshelf and Covertop

New World No. 1430 Cooker in Cream and Green Porcelain Enamel with Fixed Backplate and Folding Plateshelf

is employed with a drop-down lever handle which is positive yet simple in action

The oven is of such a design that the degree of aeration of the burner flames is not important and in fact luminous flames can be substituted. To achieve this the oven burner is housed inside a vitreous-enamelled sheet metal chamber to which air is admitted through suitable apertures. The top of the chamber is covered by an inverted funnel-like vitreous-enamelled nozzle through which the hot products of combustion are directed into the oven so as to give the desired heat distribution. This effect, which is the subject of a patent, is achieved by shaping the flue nozzle so as to guide the products of combustion appropriately into the body of the oven.

The rear wall of the burner chamber nozzle forms part of the flue outlet to which there is entry from either side. The whole fitting is of simple design and can be taken out readily as required to give full access for cleaning the burner chamber itself. Location of these parts is positive and simple and replacement after cleaning is easy.

The grid runner guides are detachable vitreous-enamelled sheet iron components hung securely on studs attached to either side of the oven. Inverted key apertures fitting over the stud heads allow the grid guides to be held securely and yet to be easily removed for cleaning. The grid guides are small enough to be readily taken to the sink for this purpose, if desired. The whole remaining oven surface with its rounded corners and absence of crevices is notably smooth. The grid shelves slide in recesses formed in the grid guides. Cleanliness is facilitated by the use of highly stain-resisting enamels. Hitherto embossed side panels had provided adequate accommodation for the grid shelves while avoiding the use of " gates." They were, however, not without their effect upon cooking and it has for some time been recognized that a smoother interior was desirable. The No. 1430 construction goes a long way to realizing this objective.

A front-reading Regulo is fitted. This is of the cleanable type and is easily accessible from the front. The gas connexion to the oven

runs from the oven tap to the Regulo head through a compact fitting which carries the by-pass screw and the gas filter. A standardized copper tube connects by unions at each end to the Regulo outlet and to the oven burner injector. The oven feed pipe can, therefore, be preformed in quantity for assembly to the cooker without the need for extensive pipe fitting.

Hotplate Unit

The hotplate unit consists of the grill chamber, which rests on the top horizontal members of the chassis, with three boiling burners and a non-reversible grill carried under the vitreous-enamelled one-piece sheet steel hotplate. The grill chamber itself is made of welded sheet steel, vitreous enamelled. It has simple contours with rounded corners and is readily kept clean. The front is provided with holes through which the front ends of the hotplate burners pass to rest on the Vertico tap injectors; it thus forms a screen to prevent the taps overheating. A small casting secured to the inside back serves to support the burners without the need for large cross straps. Two long-shank Rado burners and a single short-shank ring burner as well as a covered grill are provided. The short-shank burner is carried on a projecting lug on the left hand long-shank burner. For each long-shank burner a curved spring strip is provided on the back burner rest, under pressure from which the burners are thrust forward against a stop on the injectors. This ensures positive location and ready replacement of the burners in the correct position after cleaning. The grill burner carries side arms on which the heat-resisting steel grill frets rest. The grill is of increased size compared with pre-war grills and embodies a new design of high-speed fret. A heat-resisting sheet steel cover positively located by a peg on the burner serves to protect the grill from spillage, to improve the toasting and grilling performance and to direct the flow of products away from adjacent burners. The grill burner is pressed forward against its injector stop by a special positioning screw which bears upon the burner-rest casting.

A loose cream-enamelled crown tray rests on the bottom of the grill chamber. An aluminium grill pan with a special reversible Brander grid is provided.

Hotplate Top

The hotplate top is of a new design intended to give a simple, readily cleaned, smooth surface. The actual pan supports are vitreous-enamelled castings of simple shape finished in special heat-resisting enamel and giving adequate support for even the smallest pan. The top itself is of vitreous-enamelled sheet steel supported by a special angle strip along the front and by three projections on the cast top back. It is extremely light and with its enamelled surface and simple contours lends itself to spotless cleanliness. The enamels for both pan supports and hotplate top have been developed following lengthy investigations in the Radiation Laboratories and are the most suitable for the exacting conditions of service to be expected.

The top carries dished cut-outs in the vicinity of the burners which serve to locate the cast pan supports. The burner heads are situated appropriately below the centre discs of these supports.

Cooker Exterior

The exterior of the cooker is completed by vitreous-enamelled sheet steel panels. Two identical side panels are fitted and each is secured by a screw at top and bottom. The control panel forms a mask for the taps and the front of the grill chamber whilst the bottom panel completes the lower front. Plinths complete the sides.

The bottom panel is held in position on cleats by swivel turnbuckles and is easily removable in order to level the cooker during installation by means of the levelling screws in the feet of the chassis frame. Simple finger pressure on the turnbuckles swivels them out of position and enables the bottom panel to be lifted away. Replacement is equally simple.

The back is closed by a sheet steel panel which carries the adjustable flue plate. The design is such that two other heights of oven, 16 in. and 18 in., may be incorporated at a later date in the same chassis by the use of only 11 alternative component parts. The adjustable flue plate on the back can be lowered 2 in. or reversed to accommodate the flue nozzles of these other sizes, the lower door hinge lug may be attached appropriately lower, the door height is increased, and the bottom closing panel is appropriately shorter. The door components vary only in height for the different sizes. Inside the oven the grid guides are the only items affected.

Performance

The ratings of the burners are approximately:

Hotplate	
Short-shank ring	12,000 B.Th.U./hr.
Long-shank left hand..	8,000 B.Th.U./hr.
Long-shank right hand	10,000 B.Th.U./hr.
Grill	14,000 B.Th.U./hr.
Oven	10,000 B.Th.U./hr.

On all burners injector controls are eliminated since a pressure governor set to deliver gas at 25/10 in. W.G. is a standard fitting. Injector orifices fall into one of a series of four groups:

A	C.V. 375-420 B.Th.U./cu.ft.
B	C.V. 425-470 B.Th.U./cu.ft.
C	C.V. 475-520 B.Th.U./cu.ft.
D	C.V. 525 upwards B.Th.U./cu.ft.

With invariable orifices gas rates will vary slightly from gas to gas but will approximate to the figures given above.

Each cooker is clearly marked to indicate the calorific value range for which it is suitable. The only adjustments provided are on the hotplate burners for aeration. An adjustable cylindrical choke of accurately machined form is housed in the inlet end of each burner and secured by a screw and washer on top of the burner. It serves as a simple adjustment to meet varying gas conditions. The choke when once locked into position by the screw remains firmly secured.

Appreciable increases in thermal efficiency have been achieved on the hotplate by extensive research upon the design of both burners and pan supports. The grill enables two full rounds of toast to be prepared at once with even toasting and an appreciable saving of gas.

The oven has been specially designed to work economically. Its light-weight construction and effective thermal insulation ensure that it heats up very quickly, requiring only 5 minutes for Marks ¼ to 3, 10 minutes for Marks 4 to 7, and 15 minutes for Mark 8 upwards. Thus, the gas needed to complete a particular item of cooking, no matter whether the time be short or long, is materially reduced. Further, when the oven door has been opened to insert or remove any item being cooked the oven recovers temperature more speedily.

As a result of increased hotplate burner efficiency and of the saving in the gas used for oven work it will be found that with this cooker considerable economy in fuel and running cost can be realized. Test cooking results (in accordance with B.S.1115) and overall cooking performance using menus for a family of four (this latter a very practical test) substantiate the claim that in the New World No. 1430 cooker four therms do work previously requiring five.

STOVING PAINTS

The British Standards Institution has recently published a provisional British Standard for Performance test for protective schemes embracing stoving paints used for the protection of light gauge steel and wrought iron against corrosion, B.S. 1391.

This provisional specification provides the method of testing the performance of protective schemes under corrosive conditions to determine whether a desired standard is reached. The scope is at present limited to protective schemes in which a stoved paint finish is applied over metal coated and/or phosphated steel, and is concerned with such schemes up to including the first coat of paint. The test is made on special test specimens, or in a modified form on the actual articles, and provision is made that the test specimens shall be subjected to a standard form of damage before they undergo test. Details are included of the preparation of the test specimens, the method of conducting the test, and the standard of performance required.

The specification has deliberately been made provisional, and its issue is intended to lead to the accumulation of experience as to its applicability. It is proposed to issue a questionnaire within 12 months requesting those who have had occasion to use the test to give information regarding their experience. Users who may feel able to collaborate in this way are requested to communicate with the British Standards Institution.

Copies can be obtained from the offices of the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1, at a cost of 2s. 6d., post free.

COPPER DEVELOPMENT ASSOCIATION

As a result of heavy demands by architects, builders, and plumbers, a further issue of the Copper Development Association's publication, "Copper Pipe-Line Services in Building," has been practically exhausted, and a revised edition is now in preparation.

The Association's "Bulletin," which gives this information, states that the publication "Sheet Copper Work for Building" is also in great demand. Owing to improvements in technique, the publication is to be replaced by a new book, "Copper Flashings and Weatherings," which it is hoped will be displayed at the Association's stand at the Building Exhibition in November.

"The Resistance of Copper to Soil Corrosion" has been largely rewritten to incorporate as much as possible of the data resulting from recent research work on the behaviour of copper buried underground. The publication is to appear shortly as "Copper Underground: Its Resistance to Soil Corrosion." Fresh supplies will also be available in the near future of the pamphlet "The Uses of Copper Sheet, Strip and Tube in Building," many thousand copies of which have already been issued.

To assist teachers of practical copper work, 13 wall charts of diagrams, all of a strictly practical nature and mostly dealing with fixing details, have now been issued to educational institutions, and a further 24 have been prepared and will shortly be published.

All the Association's publications are issued free of charge to applicants having a genuine requirement for them. Requests should be addressed to Kendals Hall, Radlett, Herts. (Radlett 5616.)

THE HISTORY AND RECENT DEVELOPMENT OF THE WET GAS METER*

By B. R. PARKINSON, M.I.Mech. E., Hon.M.Inst.Gas E.

PART 1—HISTORY

The Dawn of Coal-Gas

The discovery of coal gas for practical use took place in 1792 and was due to William Murdoch. Not till 1816 was a practical attempt made to measure commercial gas by an automatic and continuous instrument. Prior to this invention, various primitive methods were employed for regulating the supply or gauging the consumption. The number and size of burners in any given establishment were made to form the basis of a contract, and this necessitated the regulation of lighting hours and the employment of inspectors to enforce the limitations. Even in 1824 there was an arrangement invented for keeping the time during which a gas supply was in use ; this consisted of a clock set in motion and stopped by the opening and closing of a tap. The success ultimately attained by the invention of the gas meter was largely instrumental in smoothing the way for the popularization of gas supply.

Samuel Clegg

It was Samuel Clegg, Engineer to the Chartered Gas Light and Coke Company, who brought out the first invention of an automatic and continuous meter. His first attempts were to form a dry meter of bladders, but finding difficulty in respect to the flexible material employed in contact with the gas he abandoned this method, and not till 1833 was a dry meter tentatively brought out. Clegg, who was an indefatigable inventor of gas plant and apparatus, then turned his attention from bladders to small gasholders, or gasometers as they were then called. He had two of these working alternatively in the same manner as the bladders, using mercury seal valves, but the lights were so unsteady that the intervention of a third gasometer acting as a governor became necessary, and this took up much room and was expensive.

A Rotary Gasholder

Clegg was at the same time engaged on inventions and improvements in other branches of the Gas Industry, and probably it was his invention of a rotary gasholder that led to the rotary gasometer. This occurred

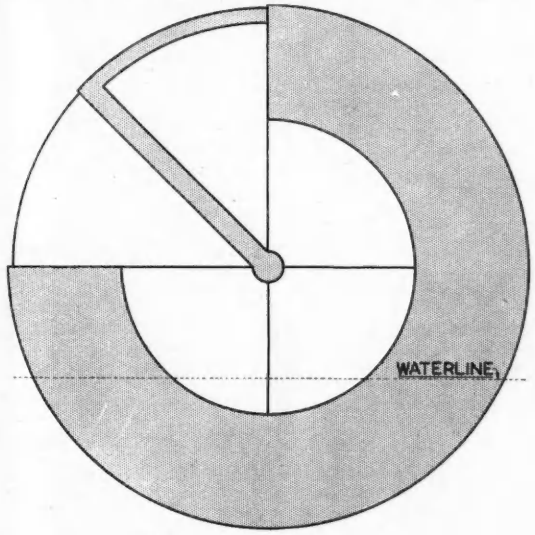


FIG. 1.—*Rotary Gasholder*

as a way out of the difficulties then experienced in the construction of gasholder tanks, and before the adoption of the telescopic principle. The design (Fig. 1) was an annular vessel turning about its axis in place of the vertical motion of the ordinary holder, and requiring only a shallow tank. Gas entered at one end of the shaft, which was tubular, and was discharged at the other end. It passed through a radial pipe into the annular space where it pressed upon the water and turned the holder until all available capacity had emerged, the range being about 250°.

* From a Paper read before the Institute of Statutory Inspectors of Gas Meters at Brighton on Sept. 24, 1947

The First Rotary Meter

To apply this to continuous measurement it was necessary to divide the annular compartment throughout the whole of the circle into three chambers. This was effected at first by means of two partitions and the water (Fig. 2). Gas was passed into these chambers from the hollow shaft by radial scroll tubes, so arranged as to form hydraulic valves. The outlets were by openings in the sides, and the water level,

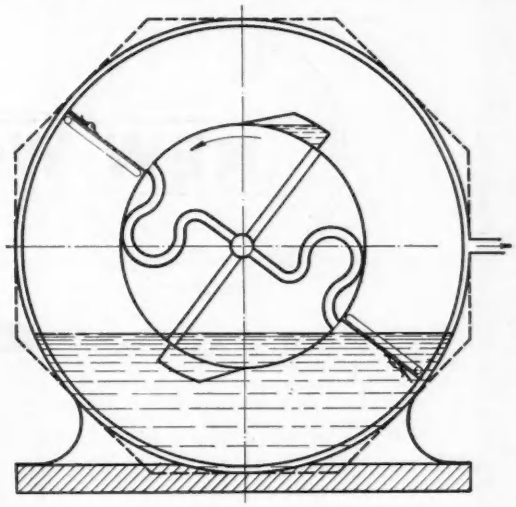


FIG. 2.—*Clegg's First Drum*

which was below the centre of the drum, was so adjusted that the inlet of one chamber was unsealed before the preceding one was closed, after which the outlet of the latter opened. The sealing of the scroll tubes was effected by small troughs of water on the inner rim.

A Labyrinth of Tubes

This meter being unequal in its division of the three chambers and unequal in the valvular arrangements, was irregular in action Clegg then constructed one with three chambers (Fig. 3) independently of the water partition, and arranged his outlets more evenly in relation to the inlets. This however was accomplished by another series of hydraulic tubes, and to add to the complication a third series was found necessary to allow for the passing of the partitions through the water or the water through the partitions, this latter to supersede flap valves. Both the inlet and outlet tubes communicated with a divided hollow shaft which served to admit gas on one side and discharge on the other, and thus the wheel stood complete without an end cover. The shaft passed through stuffing boxes which caused considerable external friction in addition to that due to the many tubes within.

This meter is of great interest because it comprises, except for the stuffing box, the entire action of the drum as subsequently perfected, and yet affords a remarkable contrast owing to its complicated construction. There were nine hydraulic seals, three to each chamber, viz., inlet, outlet, and water passage.

The present meter has the same, but instead of the ingenious labyrinth of scroll tubes the whole is accomplished by one water seal.

Rotary Principle at All Costs

We may smile at this complication, but we must also pay tribute to the extraordinary persistence and determination by which this remarkable man actually accomplished at all costs the invention of a continuous rotary gasometer by the employment of hydraulic devices for mechanical ends. The significance of this rotary action is further enhanced if we realize that Clegg was anticipating in this crude way the change over of the steam engine from reciprocating pistons to rotary turbine which came about some generations later.

The evolution of the wet meter drum to its final shape from Clegg's pioneer invention is a striking example of progressive invention, for it started off with the most fearsome complication and evolved into

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the most notable simplicity. In fact, one can only appreciate the final product to the full by realizing what it cost to produce it.

John Malam

Clegg must have realized that his invention was impracticable, or shall we say unmarketable. He was a busy man, and he had a very able assistant named John Malam, draughtsman to the Chartered Company. We could imagine him saying, "Here, Malam, you take this and see what you can make of it." That, however, is fanciful, for history records that the great Clegg was of a jealous disposition and regarded Malam for years in a strong spirit of rivalry, only very tardily admitting that he had any share in the production of the meter.

Malam also was extremely inventive, and his ingenuity probably lay more in the direction of small mechanisms, while Clegg thought in terms of larger gas plant. Malam had the true genius of the inventor who makes always for simplicity. There is a saying that necessity is the mother of invention; to which we might add "*simplicity* is, or should be, the offspring."

Malam dispensed with the labyrinth of inlets and outlets of the drum by raising the water line above the centre and introducing a bent "L" pipe since known as the "spout," taking his cue from the standpipe of the ordinary gasholder (Fig. 4). At first he divided the drum into *three* chambers as did Clegg, but afterwards increased the number to *four* in order to attain smoother working. The chambers were extended to overlap one another in such a way that when any one was full and uppermost, its extremities, the inlet and the outlet, were both just sealed by the water. This drum was sound in principle and easy to make, but it still remained in the form of an annulus, like the original rotary gasometer, with some of its capacity taken up by the

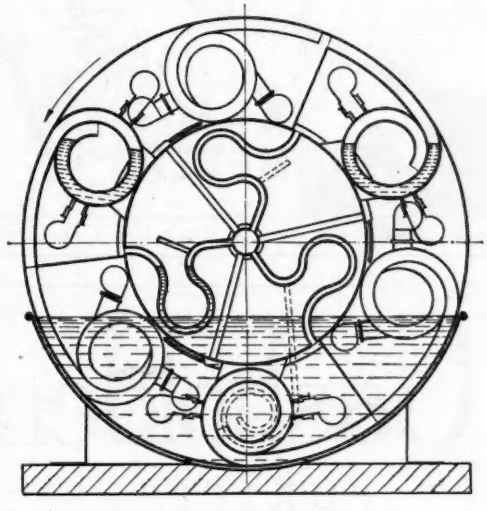

FIG. 3.—*Clegg's Second Drum*

central inlet chamber. There was also some resistance due to water passing through the chambers from openings on the inner to those on the outer rim as the drum turned, and the too sudden sealing and unsealing of the inlets and outlets.

It is worthy of note that a dispute between Clegg and Malam over Malam's patent was investigated by a Committee of the Society of Arts, who gave their verdict in favour of Malam. They awarded him their gold medal for "his invention of a gas meter, new, ingenious, superior to all others, and likely to be of great benefit to the public."

Samuel Crosley

This brings us to the year 1816, when the brothers Samuel and John Crosley established the works in Cottage Lane, City Road, London, for the construction of gas meters with Samuel Clegg as a partner. Samuel Crosley took Malam's drum in hand and, to overcome the drawbacks just mentioned, dispensed with the annulus form, allowing each chamber to have access to the water at the centre, thus establishing what has ever since been known as the "centre opening." This was the final touch that released the drum for smooth and easy working and as a marketable product. He also placed the inlets and outlets at the front and back respectively, arranging them just the same as before in their relation one to another. They then cut the water obliquely and sealed and unsealed gradually (Fig. 5).

The gas was directed to the inlets by a compartment formed by a cover on the front of the drum instead of the central chamber, which was removed. Gas passed in to the "hollow cover" (as it was called) by means of the spout. The partitions moreover were turned to an angle of about 30° with the axis, so as to pass through the water obliquely and causing the chambers as before to overlap one another, extending from inlet to outlet through nearly half a circle.

The shape of the chamber is in horizontal section a rhomboid or oblique parallelogram with inlet and outlet diagonally related. By the spoiling of the annulus, to each chamber there was added a water boundary and water vent at its base in addition to the sealing of the inlet and outlet.

The Crosley Drum

This drum required a pressure of half that necessary to drive Malam's, starting at no more than $\frac{1}{10}$ in. or $\frac{3}{20}$ in. head of water.

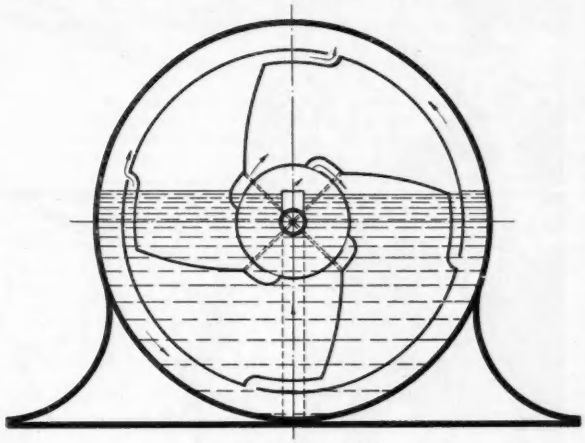

FIG. 4.—*Malam's Drum*

The final form of the invention has ever since been known as the Crosley Drum. Its great importance in meeting a vital need of the Gas Industry, then rapidly advancing, is indicated by the record that other firms in various parts of the country commenced to manufacture these instruments. Crosly instituted legal proceedings against them and in all cases recovered damages. This must have been under Clegg's and Malam's patents (3968/1815 and 4458/1820), as Crosley's improvements, important as they were, do not seem to have got beyond provisional specifications.

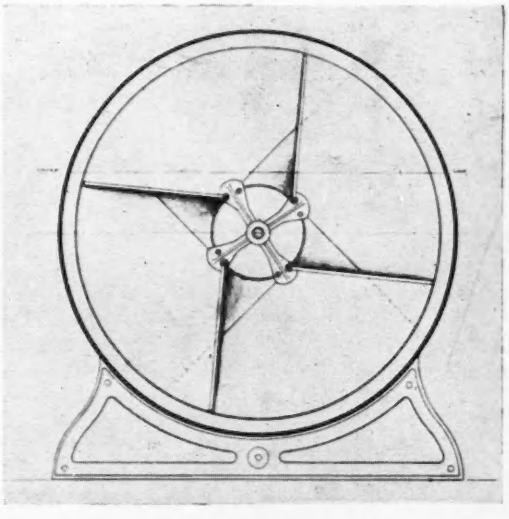

FIG. 5.—*Crosley's Drum*

Early models of the wet gas meter formed a most interesting collection in a museum at the old Cottage Lane works of W. Parkinson & Co., who succeeded the Crosley Brothers, but most unfortunately this was destroyed in a disastrous fire that took place in 1890.

A Notable Invention

The construction of the wet meter drum is a graphical study of considerable interest. There are not many instruments which have been made exactly the same in sizes varying from 2 or 3 in. to 25 ft. in diameter. As produced 130 years ago it was a pinnacle of achievement unassailable and easily equal to the demands of its day, so that the inventors need not explore its extreme possibilities. Since then

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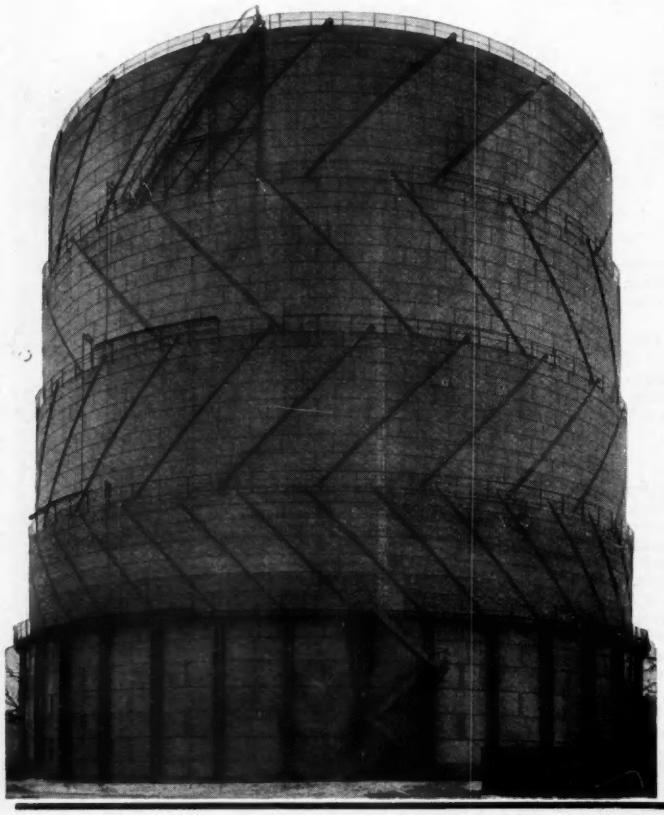

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it has been set out on familiar lines for generations, its problems often buried with the working foremen who have erected and tested it on the large scale. If there has been any stray mathematician who in the quiet of a drawing office has endeavoured to resolve its geometrical properties into formulæ and co-ordinate theory with practice the results do not appear to have been published.

A Weakness in Accuracy

This brings us to a discussion of the practical weakness of an invention which is theoretically perfect. The Crosley drum arrived at its simplest form by introducing the centre opening, giving access of its compartments to the water, and establishing the water line as a vital boundary of its measurement.

This weakness of the water level has haunted the Crosley drum throughout the whole course of its career as a medium between buyer and seller, and was the subject of many devices and patents designed to correct variations in the water line. These are of merely historical interest, and do not concern the wet meter as it has survived for essential laboratory use. For the laboratory we are more interested in certain changes that have been made in the design of the drum in recent years, by reason of which pressure absorption has been reduced and error due to variations in driving pressure greatly modified.

Three or Four Compartments

The Crosley drum was in use as a consumer's meter from the year 1816 till the end of the century, by which time it was gradually giving way to the dry type that came into practical use in 1844. The Crosley drum has been made with three compartments or with four; there is less oscillation with four. In parenthesis it is interesting to note that the ordinary dry meter has four compartments, but that it is possible to make it with the minimum of three by removing the mid partition of the case and installing a rotary valve. This works quite satisfactorily, but the effect of it in the dry meter is to reduce the capacity in the same proportion, as from 4 to 3. That can be improved by increasing the stroke of the diaphragms, allowing them to move into one another's territory in rather an interesting manner, but increased stroke with leather diaphragms is not very desirable. That however is a digression.

Troubles of the Wet Consumer's Meter

To return to the wet meter, and before saying farewell to it as a measure for ordinary consumers of coal gas, some account must be given of the particular reasons why this most interesting and classical instrument gave way to the less accurate dry meter. It was heavy and cumbersome even without the water; and it required periodical watering. That was the special burden of the gas supplier, but generally, the water, so essential to the measurement, was a practical nuisance. Periodical visits of inspectors were necessary for watering the meter, in addition to reading it, and every meter had a float attached to an inlet valve, designed to shut off if or whenever the water level declined by evaporation below the statutory limit of 3% slow. This liability for the gas to be cut off before the inspector came round to water the meter was enhanced in hot weather. In cold weather the water might freeze and put a stop to the working of the meter. That contingency could be met by adding glycerine to the water, which lowered its freezing point, but that was in days when glycerine was not quite so rare as it is with us to-day. The amount required was something like 25%.

There was tendency for the water in the meter to evaporate and then come to roost in the consumer's pipes and fittings. Hence all carcassing had to be laid with a fall back to the meter so that any condensation therein should drain back into the meter. That is why the connexions were on top, and curiously that custom has persisted with dry meters ever since, although condensate is the very last thing we desire to get in a dry meter. (The Birmingham Gas Department brought out a dry meter with the connexions at the *bottom*, and fixed a large number of these on their district where condensation was expected.)

The Glycerine Story

The gas meter in those days was not quite so self-effacing as it is to-day, but the public were at least as ignorant of its working, while sometimes a little knowledge may be dangerous. An amusing story is told of a small and compact encyclopedia that was published as a *vade-mecum* full of valuable and reliable information on many familiar things. It devoted a paragraph to the gas meter, giving instruction on the reading of the index and adding, "In very severe weather the *gas* in the meter sometimes freezes. When this happens, the best remedy is to pour in a little glycerine." The editor evidently thought this idea could be brightened up by an illustration, and there was the picture of a charming young lady pouring a pint of glycerine down the inlet of a *dry* meter.

(To be continued.)

The Grey (Discussion) Edition of the Seventh Annual Report of the Council of the Gas Research Board (Communication No. 24/12) is now available from the Gas Research Board, 1, Grosvenor Place, S.W.1., price 3s. 6d. per copy (post free).

DUBLIN'S COAL PROBLEMS

Presiding at the half-yearly general meeting of the Alliance and Dublin Consumers' Gas Company, Mr. James MacMahon said that during the half-year under review suitable British coal had not been available, and there had been a complete cessation of coal and coke exports from Great Britain. The regular weekly imports, which had, until then, withstood even the extreme vicissitudes of the war, were abruptly terminated and for almost three months their manufacture of gas had been unprecedentedly precarious. A stock of some 30,000 tons of the most inferior reject material, augmented by a few small consignments of coal almost equally unsuitable for gas manufacture had enabled them to subsist until the position had been relieved by import of American coal and by the resumption in some measure of British supplies.

They had been continually faced with the position of having only a few hours' supply of coke with which to heat the retorts, and such coke as they produced contained so much clinker that the retort furnaces were frequently extinguished. Problems with the carburetted water gas plants had been equally serious at the cessation of supplies. Imported coke stocks were equivalent to little more than a few days of manufacture. By experimentation, however, in anticipation of such a crisis, they had found it possible to utilize anthracite mixed with coke, and with emergency stocks of anthracite provided by the Government these plants were kept in operation. Later, limited quantities of coke from Britain, augmented by supplies of locally produced anthracite, had enabled them to maintain water gas production until weekly cargoes of imported coke were again available.

He paid tribute to the Eire Minister for Industry and Commerce and the British Ministry of Fuel and Power for their assistance. They could not, however, consider the present position satisfactory or the immediate future reassuring. The coal they were getting was much reduced in quantity and quality. They had made repeated and most pressing representations to the British National Coal Board and had visited colliery districts and although some improvement in quality had been achieved they were limited in selection to poor varieties of colliery reject material.

The American coal, while the best so far shipped to Eire, was in general indifferent in coking qualities and while more than double the price, was less suitable for gas-works use than much of the British coal received up to February last. They were hopeful of the result of the international conference between Eire and Britain.

"75 COOKER" LORRY

Throughout the country this new Cannon seven-tonner is welcomed as the harbinger of much needed gas cookers. Not only has it aroused interest among gas undertakings, but it is also a centre of attraction to the general public. An attractive low-loading long-wheel base Diesel by Guy, with "75 cooker" capacity, it is specially designed for quick turn-round both at despatch and receiving ends.

Put into commission six months ago by Cannon Iron Foundries, Ltd., it has already covered 15,000 miles, and it is not only the cookers that are comfortable, for the driver is "air cushioned" and the melodious triple-tone horn contributes an efficient note to the country's transport.

A New Gas-making Unit has been completed by the Rushden (Northants) District Gas Company after two years at a cost of £95,000. It multiplies the production of gas by three and is the Company's first major development since 1916. The question of distribution is to be tackled as soon as possible.